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Experiences and Lessons of a Northern Textile Manufacturer Who Moved South

The Physical and Financial Problems— Few Can Make Money During First Year

"It is costly wisdom that is bought by experience," and most men having graduated from such an expensive school are apt to keep for their own use the knowledge thus acquired. The author of this article, however, gives the more freely of his experiences and of the lessons learned because he is no longer identified with the textile industry.

No, it is not because of his experiences in moving South that he abandoned textile manufacturing, and it will be plain to anyone who reads the story of these experiences that by following the plans outlined the moving of a plant from one part of the country to another should prove successful.

The author's desire to remain anonymous is partly due to unwillingness to embarrass his old associates, and partly to the fact that he has drawn somewhat upon the experiences of others in what is written.

While the editors believe that much additional ground must be covered before the whole story of moving from North to South is told, particularly as to the expense involved, they nevertheless believe that the general problem is well handled in this article and should prove helpful to those who are considering such a move.

WHEN any textile mill reaches the point where net profits are declining, the executives immediately begin to look for the cause. In the North, where costs are high and labor presents a great problem, they first try to obtain higher prices for their merchandise, or seek specialties to carry the burden. The latter method is a hazardous undertaking at best because of lack of volume and changing public tastes. The next efforts to reduce overhead are by stressing plant economies, more production, lower raw materials or wages. Even in spite of these, competition is ever present, and finally companies are forced to turn their attention southward in an endeavor to continue old established businesses; earn a return for stockholders and preserve valuable fixed assets.

Many problems loom to the executives standing on the threshold of a southern move and the task seems of tremendous magnitude. Those who are not familiar with the South are rather at a loss as to just where to begin. Fortunate are those indeed who have friends or acquaintances who can show them the way.

The South is friendly to industries financially able to move, and is willing to help those who can show past earnings and a reasonable chance of future success. They do not want to help finance plants with old worn-out machinery, or those manufacturing merchandise the demand for which has declined.

It should not be taken for granted that a move South is a panacea for all past ills, for such is not the case. The change to a new location involves tremendous work and many disappointments with their accompanying heart-aches; however, when once reestablished the result is worth the effort.

An Engineer's Survey Is Essential

The first thing to do on deciding to go South is to secure the services of a competent engineer, and have him make an appraisal of your plant, not in detail, but more in the nature of a survey, to determine whether the machinery is worth moving. An experienced textile engineer can readily form an opinion for he knows the costs of placing old equipment in running order, and whether you can meet competition if you do move. When the machinery is all new, this is not necessary.

After the engineer determines a change would be profitable, then, if you are seeking new capital, it is well to have a general appraisal made of your entire plant, including all items to be moved, and excluding everything to remain, such as buildings, boilers, engines, pumps, electric conduits, and the like. You are now armed with a certified appraisal showing the present value of your machinery, depreciation considered, also your engineer's report showing a good condition, and are ready to seek the new capital you require.

It is necessary to estimate beforehand with the engineer your approximate cost of moving. The cost of the new buildings you will require can be figured, and then to that will have to be added all expenses incidental to moving used machinery, such as breakages in transit, packing, hauling, and shipping, as well as handling in the South, and the actual erection of the units. All freight charges must be considered, and can be estimated from the approximate number of carloads. Do not overlook a sum due to stoppage of production while moving, as overhead keeps on accumulating; also allow an amount for imperfect goods made when starting up in your new location, for, unless you are an exceptional manufacturer, your recently erected machines and your new organization will produce excessive seconds. You should also figure on additional pay roll for you will accumulate about 20% extra help on the start who will have to be weeded out.

After determining these things and arriving at the cost to move, then you should be able to ascertain whether your assets and the new capital you expect to get will carry you through.

Choosing a Location

Now if these first steps still seem to justify a move, make arrangements for a trip of inspection South with the idea of considering several locations. In your preliminary negotiations with Chambers of Commerce, some of the following factors should be carefully analyzed: The location of the town; the climatic features, schools, population, housing facilities, and railroads. The Chambers of Commerce can supply you with freight rates to your principal points of destination and the transfer points for shipments in less than car load lots. They can also give you the number of days necessary to place your goods at their destination.

Investigate the banking facilities and consider whether you will carry only local, or local and eastern accounts. Ask the local bank for a par list on checks.

You should next ascertain the means of obtaining help. Whether there are similar plants to yours nearby from which you can draw help, or whether you must start with a green organization. Skilled help is far less costly.

Check up your sources of raw material. If cotton is processed, can you use the local cotton, or must it be shipped in from the West? Freight rates on cotton should be considered. Cotton coming from Texas, Oklahoma, or Arkansas naturally carries a higher rate than that from the local State or nearby points. In case you are a user of yarns, the spinning mills near you should be investigated to see if they have equipment to make the kind and quality you require. A nearby source obviates delays and reduces the necessity of a large inventory supply.

Power rates vary in the different States of the South, and some who

make special efforts for new industries, offer better rates than others less aggressive. A thorough engineering analysis should be made of your power problem, and figures prepared showing how the rates will apply to your new plant on a basis of a connected load. You will find that while some of the rates in the higher blocks of power schedules are low, the demand charge applied by the power company to your bills will offset the savings of the lower blocks. This can all be figured in advance by your engineers and a contract made on a basis of those figures.

You should gauge closely the attitude of local capital and whether you will find there the assistance you require for future needs, or whether it will be necessary to go outside to secure accommodations. Interest rates, discounts, warehouse charges, clearing house rules and the like should be analyzed and determined.

Possible Tax Savings

Taxes are a matter of first importance to a new enterprise. Some communities are prohibited by State constitution from giving exemptions from county or city taxes. The basis of assessment should be ascertained and the rate of taxation secured for city, county and State. With these in hand you should be able to compute about what your taxes will be. Some of the southern States have provisions for the exemption of personal property that are products of the soil, and manufacturers not being primary producers may or may not be exempt. One State fixes a specific date when returns must be made on personal property, and inasmuch as a tax is levied on inventories and supplies, operations should be so conducted as to have inventories as low as possible on that date. A tax exemption for a new plant is ideal since it helps to reduce overhead during the first years of operation, and assists in the accumulation of surplus and working capital depleted by the move South.

The Approach to Financing

Next employ a firm of certified public accountants and have prepared a comparative analysis sheet of your earnings for the last five or ten years. This should set forth in a clear manner all items such as labor, power, taxes, raw material inventories, administrative expenses, selling expense, maintenance as well as dividends, extraordinary expenses, federal taxes, credit losses, and last, but not least, profits or losses. This statement along with a recent certified balance sheet can be used by you in your negotiations for capital after you have determined where you wish to locate. Prepare also if possible a schedule of costs for your plant North, and then apply southern figures as a basis of estimated savings. If you are not seeking new capital, then these statements are not necessary.

You are now ready to approach persons interested in investing capital in enterprises that hold possibilities for profit. Your negotiations from now on are purely a matter of business, the presentation of your facts and figures. The possibilities for profit in your new location, together with your present financial condition, will largely determine the terms upon which capital can be secured. This is largely a matter of your own ability; and always remember that any community will benefit from having a new industry. Weigh carefully all angles, and do not be rushed into contracts because of the necessity of stopping overhead and losses in the North. Your future depends upon lower costs and a low overhead is essential to your new enterprise.

Weigh Financial Details

The financial scheme for capital for your new plant may take many forms, but generally it resolves itself down to one of four main plans, that is: a bond issue; a stock issue; a mortgage; or a lease. A combination of one or more may be used.

In case a bond issue is determined upon, you should carefully analyze all the terms of the underwriting agreement, the trust agreement, or mortgage. Each clause should be thoroughly considered for its probable effect upon future operations and overhead. Burdensome or unreasonable clauses should be eliminated. The amount of the issue should be enough to cover your needs. If it is not sufficient, then you will have to draw on your present supply of funds for extras resulting in a shortage of working capital, and in trouble. The interest rate, of course, should be fair and will no doubt be six or seven per cent. The rate of discount to be charged by the underwriters should bear close scrutiny, for if it is heavy, it will deplete the funds you need for operating. This is a very important item and will depend largely on the presentation of your proposition and your ability to dictate terms. Whatever the discount charged is, remember it becomes an intangible amount on your books to be amortized over a period of years. Investigate any sinking fund provisions, and be sure, if one is provided, that you are allowed ample time to get your new plant in operation and showing earnings before you are required to take funds out of an accumulating working capital for a sinking fund. Look into all provisions for the retirement of the bonds and the premium required. In case you wish to call them for payment, you must know the amount of notice required.

Where a bond issue is not used preferred or common stock may present better opportunities. If preferred stock is to be sold locally to supply funds, consider the dividend rate, and whether it is to be cumulative or not. Voting privileges in preferred should be weighed with care, and do not open yourself to a chance to lose control. The amount of the issue should be sufficient to cover your needs for if it is not you will have to supply any deficiency. Always remember that architects' and engineers' estimates have a faculty of falling short of the actual cost. The stock may be sold or absorbed locally at par, which is ideal, but if it is underwritten then undoubtedly a fee or discount will be charged which you should see is reasonable. Provision should be made for retirement of the stock, and all special items such as conversion privileges and the like determined.

Mortgages are a common form of obtaining funds, but generally, unless the factory moving South is very small, mortgage will be accompanied by a bond issue in order that small investors can be attracted and the risk distributed among a number. The usual mortgage terms should be used, and, if possible, provision made for increasing the mortgage in case of expansion. In other words, an open mortgage is preferred over a closed. The amount of the mortgage, the rate of interest, and provisions for paying it off are all matters to be fully decided upon.

Some financing has been done through the use of the lease. In these cases the local town or community forms a corporation and erects the building and village. A lease is executed by this corporation to the firm coming South and a fixed rental agreed upon. This amount of rent may or may not include a sufficient sum for the purchase of the buildings over a period of years. The lease plan is a very convenient form of finance, but it is not generally used.

Essentials of a Suitable Site

While negotiating for your finances, you have undoubtedly been working with the engineers for a specific site. The final selection of this should be determined by its topography and size, having made due allowance for expansion, location of a village and general adaptability. If you are located near a river, the high water mark over a period of years should be ascertained to protect yourself against possible floods. Locate near a railroad and find out the cost of building a siding. Roads should be inspected so that your plant is accessible to motor trucks, as you will need both the siding and the roads for your building supplies during construction, and later, during operations, for shipment and receiving of goods and materials. Road building or upkeep is an item of overhead. Proximity of street car lines are convenient for help to go back and forth.

If you are to have your own village, well and good, but if not, find out the availability of houses. Local rents will increase when you start construction and your employes coming in from other points will have difficulty in finding places to live at rentals they can afford to pay. The matter of power lines should be looked into, and the nearer you are to high tension lines, substations, or steam generating units, the more protection you have against shut-downs. The matter of water supply is important and should be gone into carefully. The size of the mains, pressure and supply will have a direct bearing on your fire insurance rate, and supply water in case of bad fires and attending losses. If you are located away from towns, then your water supply becomes vital and an item of expense. All sewers and drains should be located otherwise you will be compelled to construct septic tanks. Locate the nearest fire department if near a town, as, otherwise, you must provide your own. Find out also whether you are located within city limits, or in the country, for, as previously mentioned, this will affect your tax rate.

The Building Plans

While you have been occupied in financing your new enterprise, and in the selection of a site, your engineers have been busy preparing plans and specifications. The procedure is usually first to take all the machinery you expect to move, and, bearing in mind the special features of your business, prepare a machinery lay-out. Consider this carefully for you want the most efficient lay-out possible, giving due thought to spacing, placing and arrangement for consecutive processing with all extra handling and trucking eliminated. The work should flow through your plant beginning with receipt of raw material from freight cars and into finished goods back into the cars. Get all the opinion you can on the machine plans and then your engineers will plan a building around it. Buildings of concrete can be made to last forever and on the other hand can be built too cheaply for practical purposes. You should carefully consider the type of buildings, and, of course, the more durable you make them, and the more refinements you include, the more money you tie up in bricks and mortar. A reasonable type of building, as far as durability is concerned, is the best, for remember time makes changes in all things and in twenty-five years your building may be entirely unsuitable due to progress or changes in methods. Before your final plans are complete, be sure to secure a copy of the city and State laws regulating building and see that you have complied with all the provisions for fire escapes, ventilators, toilets, stair guards, elevator gates and guards, in fact, all the various things peculiar to your new locality.

Construction and Supervision

Assuming now that your funds have been secured and you are ready to build, your next step is the securing of bids. These bids should always be submitted to open competition for there are contractors in the South who make a specialty of mill construction. The methods and practices they have developed through long experience will save you money on your costs per square foot. After the bids are in and the contract awarded the actual construction starts. The contracts you have with your engineer provides for inspection and approval of all work as well as certification of contractors' bills for payment. Your financial arrangements should have included a provision for the deposit of funds to be checked out upon certified contractors' bills presented to you. As the building progresses it should be carefully watched so that all changes

that suggest themselves during construction can be made by the contractor before completion. You will be surprised at the number of things you will wish to rearrange that the most detailed consideration of plans did not disclose. Once your contractor leaves changes are expensive.

Southern Manager Preferable

Previous to this time you have been thinking of the selection of a manager or superintendent for your plant. Secure a capable man from the South. You will find excellent men there. They are widely acquainted and know how to handle southern people. The methods are different in the South and remember your employes will all be Anglo-Saxons. They are adaptable, willing and anxious to cooperate and are desirable in every way. Your southern superintendent will know overseers and experienced help which will start your plant off with a minimum of friction. If you have technical men necessary for special processes, bring them, but you will always find excellent men in the South. While your new plant is nearing completion, put your superintendent on the ground, and let him make a trip to your plant in the North to get familiar with the kind and amount of machinery and fixtures to be shipped. A general idea of your former plant will assist him greatly on your new lay-out.

Care Pays in Shipping Machinery

While your building has been going on, your men have been busy in the North dismantling and packing machinery for shipment. Great care exercised now will save you thousands of dollars. All machines should be cleaned as taken down. Machines that are bulky should be skidded and lag screws are most desirable to bind firmly the machines to skids and prevent slipping. The jolts and jars of freight cars in transit are the things that will break machines, and precaution to prevent breakage is money well spent. In a cotton mill, for example, the first thing to do is to go through the mill with a paint pot and brush and number every machine, motor or appliance before dismantling begins. Then, as each machine is taken down, each part not boxed should carry the same number in white paint. Each box of small parts should be marked fully on the outside. Assembling is greatly aided by doing this.

Bale breakers can be skidded. Pickers should be taken apart in sections and skidded. Cards should have all small parts removed and boxed. Set the flats off the cylinders after having run a lap of waste strips or combers and whitening through the cards to fill up the wire on the cylinder, doffer and flats. See that all settings are opened wide so that no jar in transit can damage any wire or lickerin. Do not remove flats for they may become mixed and cause improper settings on assembly because of high and low flats. Roving frames should come apart and be boxed. Do not ship the drawing frames on skids; take them apart. Spinning frames should come apart and all rollers be carefully boxed. Winders, twisters and similar machines can be skidded in sections. Motors can be skidded. Do not throw loose parts in barrels or boxes without saw-dust, excelsior or some similar material, for they have a great habit of breaking. As the work progresses, a great many things will suggest themselves and precautions pay well.

When loading freight cars, the use of anchor blocks is extremely advisable. Fasten all machines to the floor of the car, so that no slippage will occur, either endways or sideways. Where three or four cards are loaded on one car, blocks should be placed at the ends of skids between the cards, so that a card cannot jam the one in front or behind. If necessary, always block machines to the sides of the car, or even the top. Do not pack heavy boxes on top of light ones. Do not pack boxes and machinery together unless both are anchored.

Railroad Cooperation

The railroads will gladly furnish you with an experienced inspector who will pass each car after loading. The carriers want you to pack everything well because damage claims reduce their revenue. Freight cars, of course, vary in length and you will find longer, or automobile cars are better adapted to some of your machinery, cards for example. Always bear in mind the minimum weight of the car in loading, for this is the basis of your freight charge.

You will find the railroads glad to cooperate with you and no doubt have already established a car load rate for your movement, fixed the route, and prepared all connecting carriers for handling the shipments.

Keep Careful Records

Records should be kept in detail. Your shipper should list every machine, part or box loaded in the cars, and this should be typewritten. One copy and the bill of lading should be forwarded to the southern plant. This list can be used for checking out each car and any shortage noted. The railroads will advise all connecting carriers daily of the movements of cars by numbers. This avoids delay at transfer points or in the yards.

Pay particular attention to breakage on checking out cars. Make full note of everything and see that the railroads are notified and an opportunity given for inspection. A good plan is to open a sort of stock ledger and head up a page therein for each machine damaged. After having a welder and machinist to repair these breaks, their time can be charged up against each machine. Any new parts can be handled in the same manner, and the stock ledger page will then furnish you a basis for your claims.

Labor-Saving Method of Handling

Shipments of machinery should be made from the North in a consecutive manner bearing in mind your southern lay-out, and avoid any confusion by mixed shipments as much as possible. Fill up the far corners of the new floor space first and avoid moving later shipments through or over machines already placed. The engineers assigned to supervise installation can assist greatly in this. In one story mills freight cars can be unloaded at the side track and all machines, parts and boxes can be trucked or moved by rollers or dollies right into place.

Where the mill has more than one floor, then great savings can be effected by using an inclined track and car to the floor level of the second floor. A platform is constructed at the trackside, the incline built to the second floor and a low receiving platform and incline to the floor built on the second floor. Tracks are laid on this structure and a small car made like those used by railroad section crews is placed thereon. The floor of the flat car is level with the floor of freight car at trackside, and the car floor is level with the receiving platform floor and incline on the second floor of the mill. The car is moved by use of an electric motor and winding drum up in the mill. All heavy machines, boxes, cards and the like can be easily placed in the mill by this device. It will pay for itself many times.

Best Men Are Cheapest

Experienced men should be in charge of all handling, for even one smash is very costly. In most cases the best men are the cheapest. As soon as machinery arrives you will need fitters for erecting it. Get good ones. Either arrange with the machinery people to supply them or get them yourself. Whatever you do, get good men, for on them depends the manner in which your mill will start up. Machines that are out of line, or poorly fitted will cause no end of trouble. Your fitter's helpers can come from local labor and you will require several gangs as well as cleaners, machanists, welders, tinsmiths and others, depending upon the luck you have had with shipments.

As the work of erection starts, you will be forced to make a number of purchases. Keep a close check on requisitions, and insist that a thorough search be made for all supplies and parts before buying new ones. Bids on purchases is the best system.

While the moving has been going on your expenses have been accumulating and now as erection progresses you will be faced with additional ones. Broken parts that cannot be welded must be replaced. Worn parts must be repaired or replaced with new. Orders for new parts will have to be placed where the parts have been lost or mislaid during moving. The closer a check is kept and a system installed, the more money can be saved from these sources. Your expenses from these items will be heavy unless your machinery is in excellent shape, and even then when a moved machine is placed on a new floor, work will be required to reline it, and to have the bearings true and the machine run smoothly.

Initial Results May Disappoint

The erection has now progressed to the point where a unit of your machinery is ready for initial operations, and the defects of the machinery will now appear and can be corrected. As the raw material starts through, speeds and production can be adjusted as necessary, and you will probably be disappointed with quality. Your new organization will contain skilled and unskilled help. They will now have to be sifted out and a permanent number selected. Close supervision is very necessary now, and, as each defect presents itself, it must be analyzed and corrected. You will find your have accumulated approximately 20% more employes than you need, but as efficiency increases and the employes become more familiar with their jobs, the weeding out process will go on. Get all the experienced, skilled help you can at the start, for they will pay in the reduction of seconds and defective work that is bound to result from a new organization. Your initial costs will be high due to lost production, speeds on newly erected equipment, settings and all the various small factors that have to be gradually corrected, besides the human factor.

As you get more under way, and, perhaps at the end of the first six months, your personnel has become settled, speeds are increasing, the quality is improving and costs are going lower. As your costs go down and quality comes up a number of your old customers are satisfied with your product and you receive larger orders. Defects become less and less, complaints disappear, the plant efficiency increases, and you are under way. During this time your machinery is settling and now comes the period of checking up final details and relining machinery for a steady run.

The Rewards of a Southern Move

The first year is one of trials, tribulations and disappointments and profits are problematical. It will be the exceptional organization that can make money the first year for there are too many deterring factors. Profits though should accrue the second year, and from then on increase.

You are established again and with accruing profits your attention is directed to financial matters, such as the gradual retirement of your bonds or stock, amortization of moving expenses and building up of working capital and surplus.

The rewards of a southern move are easier operation, more stable profits, larger orders and larger volume. You are re-established for the future. Your business is on a permanent basis.

It is gratifying to feel you have pioneered, and followed the trend from the large center to the smaller town.

The path of the manufacturer moving South is not an easy one. The way is hard and it requires money and patience. For this reason, I have tried to portray some of the things encountered on the road, in the hope that those who are planning a similar course can derive some help and assistance from one who has gone before.

Questionnaire for Mechanics

Section of S. T. A. Plans Interesting Meeting on Oct. 16

The fall meeting of the Master Mechanics Division of the Southern Textile Association will be held at the Poinsett Hotel, Greenville, S. C., Tuesday, Oct. 16.

This is Tuesday of the Southern Textile Exposition week and will be known as Master Mechanics' Day.

The meeting will be only a morning session, leaving ample time in the afternoon to take in the Exposition.

G. T. King, superintendent of power, Lancaster (S. C.) Cotton Mills, is chairman of the Master Mechanics Division, succeeding H. H. Iler of the Newberry Cotton Mills who resigned when he accepted a position which will temporarily take him out of our field of work.

Mr. King has prepared the questions listed below, and urges every master mechanic to make plans to attend the meeting and textile show on Tuesday and to come prepared to discuss the following questions:

Questions for Master Mechanics

1. What voltage would you prefer for operating motors directly connected to looms?
2. How many pounds of coal does it require to furnish steam to run the average slasher per 10-hour day?
3. How many pounds of coal does it require to steam heat the average weave mill per loom per year?
4. What is the best type of heating system both for economy and service?
5. What temperature is wanted in your weave room during winter months?
6. What effect do humidifiers have on the temperature in your weave room (particularly early in the morning; especially on Monday mornings)?
7. What type of steam reducing valve do you use and does it continue to hold pressure normal after use is discontinued on low pressure side of valve?
8. Is there any danger of a barometric condenser flooding low pressure cylinder of your engine, if so, what precautions should be taken?
9. Do you think many machinery parts are replaced unnecessarily in your mill?
10. Do the section men in your mill determine how much wear necessitates the discarding of machinery parts?
11. Do you think the overseer of each department, or his second hand should see each part that is removed from the machines in their department before permitting it to be thrown away or sent down to the shop for repair or restoration?
12. Have you tried out the plan of getting every overseer to send everything to the shop, regardless of the reason for its removal from the machines, and with the purpose in view of going through all of these parts periodically with each overseer and together determining the possibilities of restoration of each piece before it finds itself cast into the scrap heap?

As many of the questions listed above will be discussed as is possible in the time allotted for the meeting. The association urges members to make a special effort to be present.

Silk Exchange as Stabilizer

Orderly, Stable Market Set In First Week of Existence

IN the first week of its operation, the National Raw Silk Exchange has given a good demonstration of its potential influence as a market stabilizer, according to President Paolino Gerli, who declared himself gratified with the way the exchange has functioned.

"There were a number of people in the silk trade who had expected the exchange to upset market conditions," Mr. Gerli said. "Instead, the exchange has produced a very stable market, faithfully reflecting the actual conditions in the trade. Price movements have been orderly and gradual and the fluctuations on all five days of trading have been materially smaller than they averaged in the outside market before the exchange opened. At no time have they exceeded one-tenth of the maximum permitted under the rules.

"The members feel that it is a noteworthy achievement to have organized and placed in operation a futures market with facilities to serve a great industry such as silk within the short time of four months. And it is gratifying to know that the machinery of the exchange has worked so smoothly.

"The exchange may now be said to be in the second stage of its development—the spreading of useful information to the trade and to the public in order that its function in the silk industry may be better understood and its facilities more widely used.

"The inspection bureau of the exchange has just opened and as soon as the trade becomes acquainted with the system in use there and sees the relationship between the standards of the open market and the standards demanded by the exchange, the trade will fully appreciate that the exchange is the greatest factor for stabilization and for the economic welfare of the industry that has ever been organized."

Charles Cheney Comments

Charles Cheney, president of Cheney Brothers, and former president of the Silk Association of America, consented this week to answer requests for his views on the National Raw Silk Exchange. Mr. Cheney's comment follows:

"I am asked for a statement about the newly organized National Raw Silk Exchange and I respond with many misgivings.

"My thoughts in regard to the organization of the Exchange have been made public and are matters of common knowledge, and I do not think that any good purpose can be served now by stressing opinions which I held previous to the time when a decision was made to proceed with the organization. It was well enough to point out in advance such objections and dangers as I saw, but now that the exchange is organized, all of that is past and the only thing which should interest any of us is how we can minimize or avoid these dangers and help the exchange to succeed and to be as beneficial as possible.

"If it is so conducted and if the rules under which it operates are such as to tend toward its use as a legitimate instrument of trade and as a means of safeguarding operations in the future through the placing of "hedges" it can fill a useful role. If it degenerates into a legalized form of gambling, it will be a terrible curse. I hope for the best.

"I am particularly anxious that the exchange shall closely follow the methods of grading and testing which have been worked out so carefully during the last few years by members of the Silk Association of America and by leading silk interests in Japan and elsewhere.

"It would be most unfortunate if the Exchange should disregard this work or seek to supplant it by any hastily contrived substitute which would be likely to create confusion in the minds of producers of raw silk in the primary markets, thereby making any definite and universal acceptance of a basis of classification difficult, if not impossible."

How the Grades Compare

Because of the interest of the trade in relation of the silk exchange grades and the market grades the following table has been compiled by TEXTILE WORLD. The evenness test (80 panels) is the only one referred to below but it is assumed that in the other tests the silk would not be far out of line:

COMPARATIVE TABLE OF GRADES AS ADOPTED BY THE SILK ASSOCIATION OF AMERICA AND NATIONAL RAW SILK EXCHANGE

(Percentages apply to Evenness only)

Classification of Silk Association of America		Names of Grades Quoted by Leading Importers and Generally Accepted by Trade			Grades of Raw Silk National Exchange	
XXX	90%	XXX		90%		
GXX	85	Special or Super	GXX	85	A	85%
		GXX		83	B	83
CrXX	80	Special or Super	Crxx	80	C	81
		CrXX		78	D	78
XX	75	XX		75	E	73
X	65	Extra		65	F	68
No. 1	50					
No. 2	below 50					

Scene Showing First Trade Made in the National Raw Silk Exchange After Its Opening on Sept. 11. The Trading Ring is in the Center and the Rostrum on the Right

May Develop Hydro-Electric Power Near Goshen, Va.

LEXINGTON, VA.—The taking of options on approximately 1,000 acres of land in Rockbridge county, and the contemplated plans of securing options on 5,000 acres more in the same territory, indicates that there is a strong probability that Goshen Pass, about 22 miles west of this city, near Goshen, Va., will be the site of a $3,000,000 hydro-electric power project, financed by interests in which Samuel D. Insull, the Chicago and New York utilities financier, is closely associated.

Options have already been taken on six tracts of land of about 1,000 acres, which, it is said, will be covered entirely, or practically so, by water behind a 60 ft. dam to be constructed at the head of Goshen Pass. The company, which is acting in this matter, is the Virginia Public Service Co.

New Pattern Principles and Color Trends Set by Paris Fashion for New Season

Prints Most Important—More Laces and Ribbons to be Used—Beige and Gray Leaders

By Jeanne Ledoux

PARIS, FRANCE.

ALTHOUGH fashion continues with its incessant changes, the greatest success is being won by beige or gray shades slightly tinged with ochre. The forthcoming patterns from the manufacturers will show the different versions of those modifications.

Prints which have been all the rage for the last few seasons continue to reign over and conquer all other finishes. Crepes-de-chine, crepes georgette, velvets, plushes; pannes, tulles, etc., and in general, all materials will be shown with printed patterns.

It should, however, not be imagined that the appearance of those materials will be similar to that of previous seasons; decorative motifs will differ or will show color and disposition modifications which will again render them specimens of the latest fashion.

New Pattern Ideas

In general the motifs will be at greater intervals, less uniform, and will run one into the other. They will frequently mingle the harmony of numerous shades.

Cameo effects will be less in favor and will be replaced by combinations of two or three shades or will stand out above the gray and beige shades. Such will be for instance heavy crepes-de-chine, ornamented with sharp geometrical designs: lozenges, rectangles, interlaced, printed in Nile green and sulphur yellow shades on black grounds or else pink and lavender blue on a ochre-gray ground. Blue-blacks obtained by a combination of intermingled threads will serve as ground for prints based on ochre and gray.

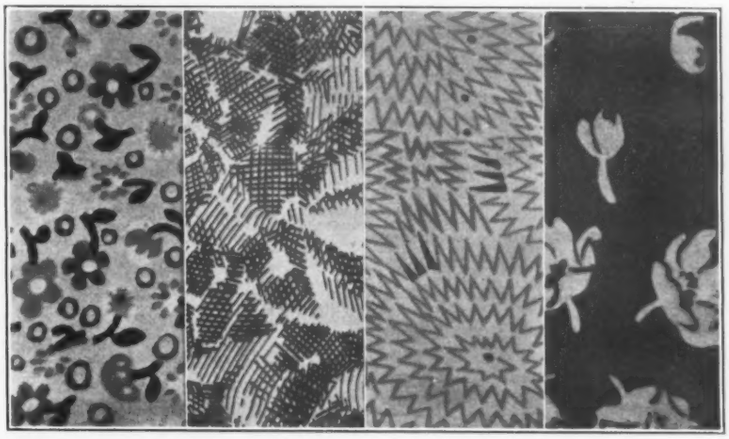
Ornamental motifs will be varied and new. Flowers with wide open petals will be popular and the different tones in which they will appear will provide extremely varied results.

The motifs will have a classical design, approaching reality and in general stylization of the decorative elements will not be so accentuated as the last few seasons. The modern effect, very new, will be obtained either by the material or by colors.

Warp prints giving the effect of run colors will soften the too sharp contours of those ornamentations.

Flower elements: roses, peonies, irises, etc., will enliven and lighten airy muslins. Their fresh and delicate shades will be woven or partially surrounded with silk or metallic threads, giving them a very smart aspect; the materials will be devoted to very dressy afternoon gowns or elegant evening dresses.

Stars, roses cut out irregularly are also used by numerous firms, their arrangement in quincunx or borders will enliven crepes-de-chine and satin crepes.



A Group of New French Prints. From Left to Right: Barret, Rodier, and Two by Raimond

Color Trends

Dark tones will be set off with vivid colors. Red on black, emerald green on black, lemon yellow on navy, grege on navy, black or nigger will be the easiest to use in feminine dress and will consequently meet with success.

Red will be the fashionable shade and certain big dressmakers are using prints on crepe-de-chine or crepe georgette, vivid red subdued by black motifs on a white ground, combined with supple woolens of a darker tone.

It should also be observed that graduations based on red will also be fashionable: warm beige, dead leaf shades, brick and reddish browns. In numerous collections there are combinations of red and white, red and black, cherry and navy, Bordeaux and string.

Ochre yellows, sulphur, lemon or greenish, although somewhat eccentric for present fashions, will certainly be pretty and utilized for sports costumes or morning dress which may combine more fancy and color. Supple duvetines, soft wool velvets, bures, will be seen in those shades which are so delicate and flattering to the complexion.

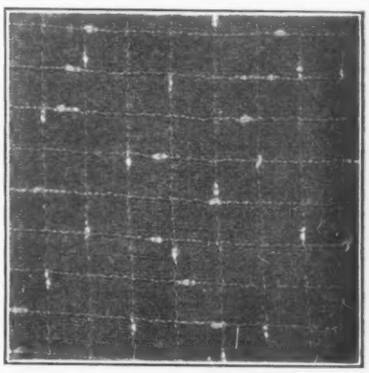
Prints on wool will be in favor and will vie with wefts of different shades representing varying ornamentations and motifs. Knotted and mingled threads along new lines will allow the same shades to be seen at regular intervals.

Among the principal ornamental motifs to be seen are diagonals in relief covering the whole width of the material, variously designed plaids will be popular, and pekins in various widths.

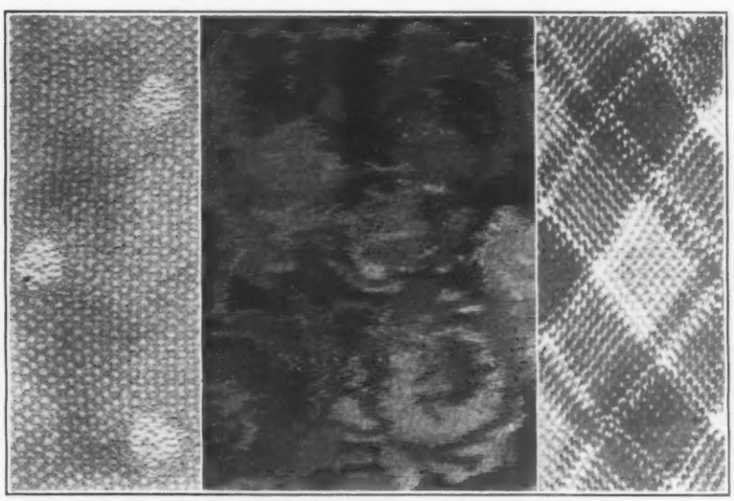
Cut designs, printed or woven, of contrasting threads will combine in groups of two or three shades at the most, among which will be principally navy and beige, also old reds and grays.

The same arrangements will be found in numerous patterns of jersey intended to replace chevrons and triangular motifs which have been seen in all their forms.

Pekins of different widths used diagonally will often be sur-cut with lights and shadows; line wefts of lighter shades in an opposite direction. This ornamentation will be applied mainly to wools and jerseys, which will allow of the use of large lines.



A Nub Yarn Check Offered by Picardie, Paris



Three Colored Yarn Effects from New Parisian Showings. Two Outside Samples by Rodier. Center a Warp Print by Raimond

Gain in Japanese Motifs

Japanese inspiration will be used as basis for future prints and ornamentations; on silks and on silk velvets alike, with attractive reflections we shall find shady and cut out landscapes.

Interpretations of Japanese lanterns, pagodas woven with gold and silver on lake red grounds, dwarf trees surrounded by tiny foot-bridges, and typical figures in colors will enliven women's dress.

Padded and blistered crepes georgette will be fashionable and their principal qualities, suppleness and lightness will make them appreciated for ensembles of straight and classical line. Navy blues will likewise be a new note in that kind of material,

also emerald green subdued with a point of gray.

Embrodiery, too, will play a large part in the future fashion and will form the richness of numerous crepes-de-chine and crepes georgette. In certain cases it will replace prints, giving beaded effects or streaks in relief of the most charming kind.

Taffetas and satin crepes will be made heavy and enhanced with embroidery. Shades will be in harmony or as cameos obtained by two or three tones, fading into and completing one another.

Note should be made of the originality of the three colors, blue, ochre and red which, according to clearness and intensity of their colors, produce such varied combinations.

Greater Use of Lace

Special mention ought to be made on the subject of lace which is daily winning a more prominent place in Paris fashion.

For smart afternoon dresses and tea-gowns, in glistening lights, silk lace with natural beige, pink, pearl gray or black shades are greatly and aptly used.

Malines and "point d'esprit" tulles will be popular for tunics and smart ensembles for coming seasons.

Mousselines of silk and crepes georgette to match those different kinds of lace or of exactly the same tones are the complement of such elegance; we can predict great success for combinations of plain materials and prints or lace.

Ribbon Use Expands

Paris fashion is likewise journeying toward a greater extension of the ribbon industry which is more in use just now in millinery, dressmaking and lingerie. More rigid qualities, more numerous ornamentations and new wefts have enabled ribbon to win a foremost place. Grosgrain of all widths, woven all of silk with close weft, will be utilized in all shades to match the materials on which they are put, in harmony with decorative prints of silks and velvets.

Reversible effects of uniform shades, moire on one side and satin on the other; or again gros-grain and satin will be used in preference for hat-trimming. For such creations, there will be quite a range of light and pastel tones based on gray, among which will be blotting-paper pink, Nile green, straw yellow, flax blue.

Mottled and moired ribbons, stiff faille ribbons or glazed moire, re-embroidered satin with motifs of several tone wools will compose charming trimmings, belts, collars, cocades or borders.

Other motifs will be seen in satins woven with metallic threads in regular lines or small motifs. Grebiches on a single border of ribbon will set off dark shades or will subdue the vividness of others. New prints will imitate plait effects on certain materials. Triangles and trimmings of extremely modern art will be obtained by an opposition of matt and glossy materials.

Rayon Consumption near Charlotte

Survey Brings Out Interesting Facts Regarding Its Expanding Use

By J. C. Patton

Charlotte, N. C.

THAT rayon is permeating almost every branch of the southern textile industry and revolutionizing the entire business, while its consumption by southern weaving and knitting mills is showing amazing increases each month are facts emphasized by a survey just completed by the Charlotte Industrial Bureau, under direction of Manager Harold D. Leslie. Mr. Leslie bases his reports on numbers of weaving and knitting mills known to have been using some rayon back in 1926; and then ascertaining present-day consumption by large groups of mills, he gives estimates which are as nearly accurate as it is possible to make them.

He finds from reports secured from 17 large mills in this territory, representing a total loomage of 15,058, that these mills now use each year 3,501,000 lbs. of rayon; also that two knitting mills with total of 161 knitting machines use a total of 25,000 lbs. of rayon per year. Thus it is shown that the present consumption of rayon-using mills is 233 lbs. to the loom and 155 lbs. per knitting machine.

Following this method of computing consumption as applied to all mills known today to be using rayon, it is found that mills within a 25-mile radius of Charlotte are annually consuming 2,181,818 lbs. Within a 50-mile radius the consumption is given at 4,904,878 lbs., while in the 100-mile radius consumption jumps to 13,029,390 lbs. In this 100-mile radius a total of 47,531 looms and 13,669 knitting machines are using rayon.

In the 150-mile radius total consumption is shown to be 19,843,101 lbs. and a total of 72,288 looms and 20,979 knitting machines are employed in use of rayon in this radius.

Figuring 300 working days to the year, it is seen that mills within a 25-mile radius of Charlotte consume 7,273 lbs. per day; within a 50-mile radius a total of 16,350 lbs. per day is used; within a 100-mile radius a total of 43,431 lbs. is used, while in the 150-mile radius total consumption is 66,144 lbs. per day.

Effect on Cotton

Just what reduction in the consumption of cotton used in manufacture, if any, has followed the growing use of rayon is a moot question, some claiming that use of cotton is increased, in making goods with rayon combinations, by greater demand for same, while others argue the opposite. It was impossible to get any definite information along this line from those interviewed by this writer.

Mills Using Rayon

As indicating the wide use of rayon by long established southern plants, the following list is of interest:

WEAVING MILLS IN CHARLOTTE AREA KNOWN TO BE USING ARTIFICIAL SILK

Within 25 Miles

	No. Looms
Pinoca Mills, Pinoca, N. C.	60
Highland Park Mfg. Co., Charlotte, N. C.	1,806
Savona Mfg. Co., Charlotte, N. C.	726
Carl Stohn, Inc., Charlotte, N. C.	96
Stuart Mills, Charlotte, N. C.	50
Veritas Silk Mills, Charlotte, N. C.	40
Cannon Mfg. Co., Kannapolis, N. C.	1,729
McAden Mills, McAdenville, N. C.	350
Gibson Mfg. Co., Concord, N. C.	636
Hartsell Mills, Concord, N. C.	200
Hobarton Mfg. Co., Concord, N. C.	116
Gastonia Weaving Co., Gastonia, N. C.	30
Cramerton Mills, Cramerton, N. C.	500
Nat. Weaving Co., Lowell, N. C.	600
Cascade Mills, Mooresville, N. C.	300
Mooresville Cotton Mills, Mooresville, N. C.	1,820
Total looms using rayon within 25 miles	9,059

Within 50 Miles

Add total within 25 miles	9,059
Ivey Mills, Hickory, N. C.	400
Brookford Mills, Brookford, N. C.	631
Dilling Cotton Mills, Kings Mountain, N. C.	150
Margrace Mills, Kings Mountain, N. C.	96
Patricia Mills, Kings Mountain, N. C.	176
Pauline Mills, Kings Mountain, N. C.	156
Anderson Cotton Mills, Lincolnton, N. C.	100
Rhodes Rhine Mfg. Co., Lincolnton, N. C.	126
Minette Mills, Grover, N. C.	40
Wade Mfg. Co., Wadesboro, N. C.	400
Warlick Mfg. Co., Newton, N. C.	122
Klumac Cotton Mills, Salisbury, N. C.	162
Marsh Cotton Mills, Salisbury, N. C.	112
Eastside Mfg. Co., Shelby, N. C.	308
Ora Cotton Mills, Shelby, N. C.	176
Shelby Cotton Mills, Shelby, N. C.	512
Dover Mills Co., Shelby, N. C.	264
Shelby Cloth Mills, Shelby, N. C.	512
Cleveland Cloth Mills, Shelby, N. C.	150
Deep River Mills, Randleman, N. C.	878
Aragon Baldwin Cotton Mills, Chester, S. C.	568
Republic Cotton Mills, Great Falls, S. C.	2,320
Arcade Cotton Mills, Rock Hill, S. C.	452
Aragon Baldwin Mills, Whitmire, S. C.	1,600
Total looms using rayon within 50 miles	19,470

Within 100 Miles

Add total within 50 miles	19,470
Aurora Cotton Mills, Burlington, N. C.	847
Burlington Mills, Inc., Burlington, N. C.	200
E. M. Holt Plaid Mills, Burlington, N. C.	500
Elmira Mills, Burlington, N. C.	657
Stevens Mfg. Co., Burlington, N. C.	160
Pomona Mills, Greensboro, N. C.	798
Southern Silk Mills, Greensboro, N. C.	48
County Moore Mills, Inc., Hemp, N. C.	96
Hillcrest Silk Mills, High Point, N. C.	364
Stadil Silks Corp., High Point, N. C.	507
Erlanger Cotton Mills, Lexington, N. C.	1,240
Dacatah Cotton Mills, Lexington, N. C.	650
Wenonah Cotton Mills, Lexington, N. C.	430
Roberdel Mfg. Co. No. 2, Rockingham, N. C.	1,150
Horn Co., Spindale, N. C.	54
Stonecutter Mills, Spindale, N. C.	804
Virginia Cotton Mills, Swepsonville, N. C.	504
Waldensian Weavers, Inc., Valdese, N. C.	168
L. B. Holt Mfg. Co., Graham, N. C.	890
Clinton Cotton Mills, Clinton, S. C.	1,570
Lydia Cotton Mills, Clinton, S. C.	602
Moore Mills, Cowpens, S. C.	36
Fairmont Mfg. Co., Fairmont, S. C.	328
Victor Monaghan Mills, Greenville, S. C.	2,241
Derry Damask Mills, Gaffney, S. C.	40
Irene Mills, Gaffney, S. C.	134
Piedmont Plush Mills, Greenville, S. C.	24
Duncan Mills, Greenville, S. C.	1,800
Judson Mills, Greenville, S. C.	2,200
Victor Monaghan Mills, Greenville, S. C.	1,610
F. W. Poe Mfg. Co., Greenville, S. C.	1,700
Shamrock Damask Mills, Landrum, S. C.	60
Laurens Cotton Mills, Laurens, S. C.	1,234
Palmetto Mfg. Co., Laurens, S. C.	75
Watts Mills, Laurens, S. C.	960
New England Southern Mills, Pelzer, S. C.	2,552
Drayton Mills, Spartanburg, S. C.	850
Total looms using rayon within 100 miles	47,531

Within 150 Miles

Add total within 100 miles	47,531
Durham Cotton Mfg. Co., Durham, N. C.	800
Golden Belt Mfg. Co., Durham, N. C.	568
Yarborough Mills Co., Durham, N. C.	100
Bellevue Mfg. Co., Hillsboro, N. C.	600
Eno Cotton Mills, Hillsboro, N. C.	1,121
Mansfield Mills, Lumberton, N. C.	600
Caraleigh Mills Co., Raleigh, N. C.	520
Patterson Mills Co., Roanoke Rapids, N. C.	1,000
Rosemary Mfg. Co., Roanoke Rapids, N. C.	1,272
Lily Mills, Spray, N. C.	500
Carolina Cotton & Woolen Mills, Spray, N. C.	1,654
Kenneth Cotton Mills, Walhalla, S. C.	80
Oconee Mills, Westminster, S. C.	260
Consolidated Textile Corp., Lynchburg, Va.	1,578
Alta Vista Cotton Mills, Altavista, Va.	604
Riverside & Dan River Cotton Mills, Danville, Va.	13,500
Total looms using rayon within 150 miles	72,288

Army Melton and Leggin Cloth Proposals Opened

PHILADELPHIA.—Depot Quartermaster, 21st and Oregon Ave., opened proposals for furnishing them with 7,000 yds., olive drab melton cloth, Sept. 14. The following concerns submitted bids:

Lacon (Ill.), Woolen Mills, $2.40, net, delivery within 90 days; Columbia Woolen Mills, Columbia City, Ind., $2.55, net, delivery of 2,000 yds., October and November, delivery of 5,000 yds., in December; Warrenton Woolen Co., Torrington, Conn., $2.84, net, delivery of 500 yds., 10 days, 500 yds., weekly thereafter until completion; Kent Mfg. Co., Clifton Heights, Pa., $2.65, net, delivery of 4,000 yds. December and 3,000 yds. in January; American Woolen Co., $2.62 net, delivery complete in 90 days.

Leggin Cloth Contract

Depot officials have announced that contract to supply them with 36,671 yds. leggin cloth, worsted warp, woolen filling, 72 in. to 74 in. wide, has been awarded to Kent Mfg. Co., Clifton Heights, Pa., whose bid on this item was $2.33. These bids were opened Sept. 6 and the lowest figure quoted at that time was $2.2449 received from Farnsworth & Talmage, New York. Contract was not placed with this concern because their material did not conform with specifications and Kent Mfg. Co., the next lowest bidder, received award, their bid being on specification material.

Other bids opened on leggin cloth were: Auburndale Mills, Inc., New York, $2.77; American Woolen Co., Boston, $2.65; J. P. Stevens & Co., New York, $2.67 and Cleveland (O.) Worsted Mills, $2.65, all terms being net.

Operating Executives of Georgia Discuss Weavers' Knots, Multiple Loom System, Slashing, Etc.

Instructive Meeting Held in Atlanta— J. W. Hames is Elected Chairman

ATLANTA, GA.

THE Textile Operating Executives of Georgia, meeting at the Georgia School of Technology in Atlanta on Sept. 18, had unusually interesting discussions on spooling, warping, slashing, and weaving processes in cotton mills. Frank S. Dennis, of Lafayette, Ga., general chairman of the organization, presided and introduced the discussion leaders, who were: For spooling and warping, Frank E. Heymer, Columbus; for weaving, Frank K. Petrea, Columbus; for slashing, Geo. S. Elliott, New Holland. The questionnaire on which discussions were based was prepared in advance and questions assigned to various members for discussion. This innovation made the talks on the questions much fuller and more informative than has been the case at some previous meetings.

Praise Weavers' Knots

In the discussion of spooling and warping processes, the questions ranged from improving work of warpers by making changes in stop motions, to the cause of soft places in beams. When the question as to improvements observed in weaving by using weavers' knots came up, J. W. Hames, superintendent of Exposition Cotton Mills, told the meeting that 18 months ago he began to experiment with weavers' hand knotters and seven months ago completely equipped one of his mills with them. On a test, Mr. Hames said, he had found that spooler knots caused 84% more loom stops than weavers' knots. R. W. Jennings, superintendent of Lanett Cotton Mills, said that more fixing was necessary on weavers' hand knotters than on spooler knotters, but that he had made several tests which always showed better results from weavers' knots. Mr. Elliott made the point that having to keep weavers' knotters in good repair was really a protection to the mill using them because it insured getting weavers' knots. Mr. Heymer said that no machine should be condemned merely because it had to be kept in good repair.

Tests on Knotters

General Chairman Dennis told about adopting the weavers' knot in his mill and using it on all work requiring reeds with as many as 48 dents. He said that reeds as fine as 48 dents would catch the ordinary spooler knot. He also said that with weavers' knot in use, spooler kinks were practically unknown. Mr. Steele said that at his mill the hand knotters were turned in to the fixer at the noon hour and necessary adjustments made then. He believes that the use of the weavers' knotter increased production. Mr. Edwards said that the weavers' knotter was used successfully on the ply yarns in his mill, but he did not think it would pay to use the weavers' knot on single yarns which were subsequently to be plied. Another member said that spooler knots gave no trouble in reeds up to 24 dents and on test in his mill he had found repairs to weavers' knotters excessive and that these knotters slowed up production on his spoolers and warpers.

A few weavers' knotters having been used along with spooler knotters during the test, Mr. Hames said that he had had trouble with help until he changed over entirely to the weavers' knotter. Mr. Heymer had had the same experience as Mr. Hames, and attributed it to the fact of the mental attitude of the help.

E. H. Rogers, the agent of the Fulton Bag & Cotton Mills, Atlanta, Ga., exhibited a spooler tension and showed the members the points at which the yarn had cut grooves. He described his efforts to eliminate the grooving of the device, including filing smooth and case hardening. Other members told him of a porcelain guide which had relieved them of similar trouble.

The cause of soft places on beams was suggested as possibly misaligned beams or drums working loose on shafts.

Weaving Problems

In the discussion of weaving problems, led by Mr. Petrea, the questions on the multiple system of weaving brought some interesting responses from mill men who were using it. A man in a mill making narrow sheeting said his battery hands were putting in 428 bobbins per hour, attending to 50 batteries and bringing the filling bobbins to the looms. He found that his weaver could take care of 303 loom stops in 10 hours, and each weaver was running 84 looms. The battery hands bring their filling to their sections, but the empty quills are collected for them. This mill had secured 1½% increase in production using the multiple system of weaving.

W. L. Phillips, superintendent of Social Circle (Ga.) Cotton Mills, gave his experience with the multiple system of weaving as follows: Battery hands putting in seven bobbins per minute, hauling their own filling and tending the batteries on 44 90-inch looms, 36 to 40 loom stops per hour could be taken care of by a weaver, and the new system need not slow up production when it was being put into effect. He added that his filling chute was in the middle of the weave rooms, and the truck of each battery hand was filled from the chute with enough quills at one time to enable him to make the round of the batteries in his section.

Marion Grimes, superintendent of Chicopee Mfg. Corp. of Ga., under the multiple system of weaving said that battery hands could put in 11½ bobbins per minute if only required to fill batteries. This number being the maximum and 10 bobbins per minute being the average. His battery hands were tending 90 looms using 40s filling. He thought a weaver could take care of as many as 50 loom stops an hour, but this depended on the cause of the stops. Mr. Grimes did not think loss in production necessary while installing the multiple system in a mill's weave room.

E. B. Wise, Superintendent of Martel Mills, Egan, Ga., wanted to know how the quality of the goods held up under the multiple system of weaving. Mr. Phillips told him the quality of goods improved because the weaver only looked after those things that caused seconds. He told of a mill having six pickout hands before putting in the multiple system, which now had only one such hand with the multiple system in use. The question came up as to whether the weaver or the battery tender was charged for seconds caused by mixed filling. Mr. Phillips said that this was charged to the battery tender. General Chairman Dennis explained that the questions about practices under the multiple weaving system had been put on the program so as to get answers to fundamental problems connected with the new method for the benefit of mills considering adopting it. He said that weavers must not nurse batteries if the multiple system was to be a success and that the weaver's mind must be relieved absolutely of all responsibility for the batteries, allowing him to concentrate on keeping the loom running and starting it up quickly when it stopped. Mr. Heymer said his mill had changed over to multiple system of weaving about three months ago at request of employes, after making a failure of the system in a trial about a year ago. He said his battery hands were putting in 540 bobbins an hour, weavers were taking care of an average of 40 loom stops an hour, filling haulers were putting 3,000 bobbins per hour in the stands and removing empty quills, and no loss whatever had been shown in production. Mr. Phillips advised mills considering putting in the multiple system of weaving to be sure all their work up to the weaving was of the best possible quality otherwise they would have trouble.

Pay Based on Picks

There was brief discussion of whether weavers should be paid by cut, pound, or pick. The general opinion seemed to be that basing pay on picks was the best method, particularly where the mill was operating on two shifts. The causes of wavy or crooked selvage were suggested as improper contact between the cloth and the sand roll; excess tension on one side of slasher; misalignment of cloth roll or sand roll; and loose end on loom beam. In general, it was said that anything that had a tendency to put greater tension on one side of the warp would cause wavy or crooked selvage. A member pointed out that a misaligned lay on the loom would also frequently cause this trouble. General Chairman Dennis told the meeting that in looking for causes of this defect in cloth it was wise to check every possible source of the trouble as it might be caused by so many different things.

Tightening both springs and spring covers was mentioned as a means to keep bobbins in proper alignment in the shutter to prevent filling breaks. Mr. Elliott said that warped bobbins would also cause filling breaks and that he had found that filling breaks occurred about 50-50 while the loom was running and while it was changing. Mr. Petrea advised examining shuttles for defects when excessive filling breaks occurred.

J. W. Hames Elected Chairman

After the discussion of weaving problems, the meeting adjourned for luncheon at the new commons of the Georgia School of Technology. General Chairman Dennis announced that J. W. Hames of Atlanta had been elected general chairman and Frank E. Heymer, of Columbus, vice general chairman, for the coming year. George S. Elliott, New Holland, Ga., was unaminously elected a member of the executive committee to succeed Frank B. Williams, Fairfax, Ala., whose term had expired, and A. Lehman, Jr., LaGrange, Ga., was elected to the executive committee to serve during the unexpired term of Mr. Heymer.

Geo. C. Harris, president of Exposition Cotton Mills, and J. J. Scott of Scottdale, Ga., president of the Cotton Manufacturers Association of Georgia, spoke briefly commending

(Continued on page 85)

Predetermined Normal Production

A Critical Analysis of the Cost Outline Published by the Institute

By Frederick Moore, C.P.A.
Of Rhyne, Moore & Thies, Charlotte, N. C.

In this article Mr. Moore takes exception somewhat to the trustworthiness of the basic principles presented in the cost outline published, under date of Aug. 31, by The Cotton-Textile Institute as a guide to sales policies. In fact, it might be considered a challenge to the soundness of those principles.

In submitting the article for publication, however, Mr. Moore states that he is making no attempt to undermine the sincere and conscientious work now being performed by The Cotton-Textile Institute; he is merely presenting another side of a very important question, and in doing so believes he is following the suggestion of President Walker D. Hines, who, in the preface of the cost outline, has welcomed any attitude but that of indifference.

NO method of textile costing can be said to be truly scientific which, in order to obtain a so-called fabric cost, uses as a basis any volume of production either manufactured or to be manufactured by machines whose normal capacity is continually in excess of that established volume. The point of view of such a method is entirely unscientific since it cannot, and makes no attempt, according to its basic principles, to give an accurate or intelligent explanation of manufacturing experiences either with respect to production or the cost of production.

"Actual," Not "Normal" Production

The predetermined normal production that is suggested in the cost outline prepared by The Cotton-Textile Institute as a basis for computing normal costs, is, after all, nothing more nor less than a predetermined actual production. It is obviously not a true normal production since it is not in any way associated with possibilities either ideal or normal, nor can it be used effectively to measure such possibilities.

The word "normal" is derived from the Latin "norma,"—a carpenter's rule—a standard by which not only the lengths of objects can be measured, but the variations in length between them, the latter objective being primarily the purpose for establishing the standard.

In the textile industry, therefore, the normal production would naturally be understood to be that production which can be reasonably obtained in a fixed number of operating hours under established manufacturing conditions. The normal production, for instance, of a loom weaving a certain fabric for 55 hours would be its 100% theoretical production, less a reasonable allowance for unavoidable stoppage. This production represents a measure of possible attainment, and is the only intelligent yardstick by which actual accomplishments may be gauged.

Deduction for Idle Time

While in computing this normal production for a fixed number of hours, it is proper to deduct from the 100% maximum theoretical production, an allowance for necessary and usual stoppage of machinery, it is altogether unnecessary and impracticable to further reduce this production by an allowance for idle time occurring either during these hours or any future operating hours. Such a deduction precludes the opportunity of measuring the difference between actual accomplishments and normal possibilities during any current operating period. It also reduces the normal production to such an extent that the resulting figure of production not only is an unreliable guide to current possibilities, but tends to retard industrial effort since it is possible, during any actual full time operating period, to obtain a production much in excess of that which has been forecast as a normal production, but which, in fact, is neither a normal nor an actual production.

Production data prepared in this manner cannot explain causes for high costs, much less measure the extent or cost of subnormal manufacturing conditions, since they do not deal in any way with normal machine capacities. They should have little or no appeal to a manufacturer who desires to know more about what he can do, more about what he is doing, and more about why he is not doing what he has computed he can do. To be sound, cost methods must be founded upon principles which are prepared to deal alike both with cause and effect. Fabric costs derived from them must be more than mere advance statements of actual experiences, whether present or remote.

Whether or not it is the desire of a manufacturer to compute the cost of a fabric on the basis of its normal cost, its probable actual cost, or both, it is altogether unnecessary for him to compute in advance either the total normal or the total actual production of his mill as a basis for arriving at such a cost.

Since the normal loom production of each fabric during a distinct number of hours, can be determined with a positive degree of accuracy by computing the normal production of one loom, it is not only inadvisable but impracticable for the purpose of predetermining an individual fabric cost, to extend the calculations so as to compute in advance either the total normal or the total actual mill production.

Even if it were expedient to compute such total productions as a basis for predetermining costs, such estimates of production would be grossly inaccurate due to frequent changes in machinery assignments, occasional changes in machinery speeds, and constant changes in operating schedules. In fact, the use of total estimated productions would require such a constant readjustment of cost as to discourage any constant effort upon the part of a mill accountant to keep up with them.

Experience indicates that with respect to the matter of production, that production which remains the most constant, over a period of time, is the normal production of a loom or spindle, such production remaining practically fixed and is changed only as normal changes are made in speeds, even though the actual production of those spindles and looms is constantly shifting. It is therefore evident that normal machinery production is the only reliable basis by which a normal or stationary cost can be obtained, and the only basis of production which serves to indicate and measure not only non-production and subnormal production, but the cost of such failure.

Predetermined Costs

There are three major objects for which costs are prepared:

1. As a basis for directing sales.
2. As a basis for comparing actual accomplishments with normal possibilities and locating promptly the amount, the cause and the effect of any variations upon the normal cost of each fabric.
3. As a basis for comparing the cost of like products between mills.

Depending upon conditions, a greater or less degree of importance may at times be attached to each one of these objects but under usual conditions each one of them has its distinct and relative importance.

Any cost method which by its plan of operation not only places undue emphasis on any one of these objects to the exclusion of the others, but whose basic principles are such as to be unable to consider intelligently but one of these objects, cannot be said to be fundamentally sound.

It would seem that The Cotton-Textile Institute, in a conscientious effort to correct the evils of price cutting, has advanced principles of accounting directed to the solution of sales problems while practically ignoring those other problems directly associated with manufacturing and the cost of production—problems encountered daily by mill executives.

Many conflicting ideas may exist with respect to a proper definition of cost. Notwithstanding this fact, however, cost, whether predetermined or ascertained, invariably consists of two factors:

1. The normal manufacturing cost of actual production.
2. The actual cost of non-production.

The normal manufacturing cost of actual production, considering one unit of a fabric as a basis, is that cost obtained by applying the normal production of a loom making that fabric during a fixed number of hours, to the total expense necessary to secure not only this normal loom production, but the normal production of all machinery required to furnish yarn for this loom.

The actual cost of non-production constitutes the cost of idle machinery and partial failure at times with respect to operating machinery. Its existence has been recognized as a distinct and separate cost, but the value of showing it as such has by no means been fully appreciated.

Charging Production Cost

In the past it has been customary to charge the cost of production with the total expenses incurred even though one-fifth of the plant might have been idle and the remaining four-fifths operated only at 75% of its normal capacity. It should be self-evident, at least from the standpoint of manufacturing, that expenses incurred during a period when there is no production, cannot rightly be considered an addition to the cost obtained during any period when there is a production. Likewise, there is little justification for the belief that expenses incurred in operating machinery below its normal capacity, are a part of the cost of the production actually obtained.

Examined as a distinct item of cost, the cost of both non-production and subnormal production will be seen to have no relation whatsoever to the real or true cost of a fabric, since it does not assist in producing that fabric. To arbitrarily create such a relationship by merging it in the total cost of production, not only removes the possibility of knowing intelligently what a fabric should cost under normal operating conditions, but conceals every cause which gave rise to any departures therefrom.

Basic principles established for the sole purpose of computing fabric costs from the standpoint of selling, and which conceal the cost of non-production or subnormal production in those costs, by ingenuously saddling the spindles and looms which are operating normally, with the cost of those which are either not operating or operating subnormally, defeat one of the most important purposes for which cost methods were intended.

The fact that no attempt has been made in the past to separate the cost of non-production from the cost of production, might be excusable on the

(*Continued on page* 100)

THE TEXTILE OUTLOOK

General Business Volume Large, Profits Not in Proportion and Public Speculation May be Overdone, Says Dr. Haney

BUSINESS is in large volume. This is true whether we consider the indexes of industrial production, retail trade, or bank clearings. The activity of industry as a whole is a little above normal. It is the more notable that the averages show this, in that the activity of the textile and coal industries is so low.

Condition of Business Fairly Good

The condition of business, as reflected in profits, is rather mixed and on the whole probably does not make so favorable a showing as does the volume. The earnings statements published by the large corporations covering their operations in the first half of the year show diverging trends and are nearly evenly divided between those which show a decline from last year and those which show a gain. Thanks largely to the very favorable statements of a few of the largest companies, the total earnings considerably exceed those of a year ago. Business failures, however, are numerous and last month the amount of liabilities involved was large. Complaints of poor collections are quite general. It seems fair to say that, while the leading companies in most industries are prosperous, the great mass of industrial concerns are making a showing that is only fair.

Margins of profits are narrow, and the general average of production is about as high as it can be with commodity prices maintained at their present level. One must continually remember that booms do not start in periods in which production is already above normal. The present favorable condition as to profits is unusually dependent upon a sustained large volume of business, and should activity decline, it is more than likely that profits would suffer disproportionally.

For the present and near future, however, ***the prospects are for a fairly stable volume of business.*** There is evidently no expansion that is greater than seasonal, and building activity is actually on the decline, but commodity prices are stable and no important general maladjustments appear in the industrial situation, so that the present tempo (allowing for seasonal conditions) is likely to be maintained throughout the year.

The strongest feature is the evidence of a well sustained demand from consumers. This appears in the showing made by retail trade. Of course, the sales of the chain stores and of the big mail order houses have increased sharply due to the addition of new stores, but even the department store sales, though lower than a year ago, have shown a rising trend of late. Another evidence appears in the large volume of automobile sales, which have held up extraordinarily well for the season. People evidently are able and willing to buy new cars. Largely as a result of this, the steel business has been unusually active.

But there is some danger that the speculative spirit that is prevalent and that is so manifest in the stock market, is running to excess. The volume of automobile sales may be an evidence of this. A question that naturally presents itself is, are the American people not on a sort of economic spree? Are they not buying more stocks, automobiles, etc., than is good for them? Certainly the collapse of the stock market is bound to come sooner or later and this constitutes a threat to the business situation. Probably the world has never seen such widespread speculation and a stock market that is so unusually dependent upon an enormous volume of demand loans supplied from non-banking sources. So large a proportion of the people being involved in the stock market, a collapse in that market would bring widespread loss.

Unfavorable Aspects in Money and Building

The least favorable aspect of business is found in the money market and its results on building activity. Time money for the shorter periods has risen to the highest point in seven years. The total loans and discounts of the member banks are about 22% in excess of their net demand deposits. Both brokers' loans and other loans and discounts (largely commercial) are at very high levels. On the whole, the position of bank credit and money rates are the least favorable since 1920.

Some optimists are looking for a change in the policy of the Reserve Board and for large importations of gold, which would ease the situation. Neither appears likely. Purchases of bankers' bills by the Reserve Banks are a necessary seasonal occurrence in the autumn and it is common for us to receive a little gold from England during the season of crop exports. These developments mean no change in the fundamental situation. Money rates will continue high.

Already the tightening of the money markets has had some effect on building activity, and this, together with the fact that the building program of the nation has exceeded requirements in a good many sections, caused a more than seasonal decline in building contracts and in building permits during August. Should this

Textile World Analyst

The analysis and forecast by Dr. Lewis H. Haney, Director, New York University, Business Research Bureau, which regularly appears on this page, considers various branches of the textile industry from week to week. The conclusions reached in the Analyst are mostly forecasts and generally apply to a time two or three months ahead. The Analyst is based on statistical data and does not reflect temporary trade sentiment.

SUMMARY—GENERAL

1. The total volume of business activity is large and above normal, but profits do not make quite as favorable a showing.

2. Business will probably continue at about the present level of activity, allowing for seasonal conditions, over the balance of the year.

3. Money rates will continue high. High money rates are tending to check business, and their effect appears in a decline in building activity.

4. Cotton and wool manufacturing continue in a depressed condition and mill stocks averaged lower in August in spite of the general bull movement in the stock market.

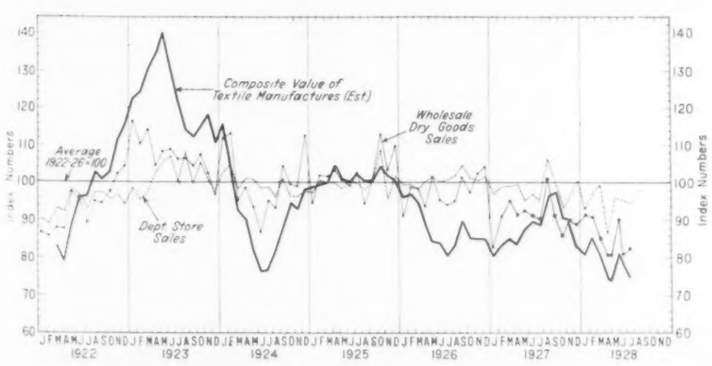

Composite Value of Textile Manufactures (Est)
Wholesale Dry Goods Sales
Average 1922-26=100
Dept. Store Sales
Index Numbers
JFMAMJJASOND JFMAMJJASOND JFMAMJJASOND JFMAMJJASOND JFMAMJJASOND JFMAMJJASOND JFMAMJJASOND
1922 1923 1924 1925 1926 1927 1928

Fig. 1. GENERAL TEXTILE BAROMETER—Wholesale Dry Goods Sales—Adjusted for seasonal variation; 1922-1926 Average = 100; (Federal Reserve Board) Dep't Store Sales—Adjusted for seasonal variation and trend; (Federal Reserve Board) Composite Value of Textile Manufactures (Estimated)—Weighted Composite of Cotton, Wool, and Silk Machinery Activity adjusted for Seasonal Variation and price levels (N. Y. University, Bureau of Business Research).

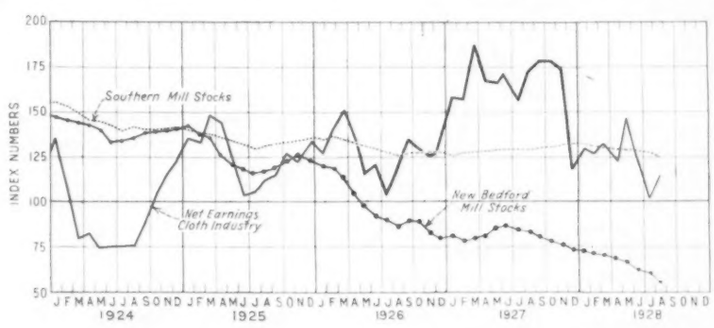


Fig. 2. COTTON MILL EARNINGS AND SECURITY PRICES—Net Earnings in Cotton Cloth Industry—Computed from the cost of raw material, labor, fuel, etc., the price of finished goods and the volume of production (New York University, Bureau of Business Research). New Bedford Mill Stocks—Average price 25 New Bedford Cotton Mill Stocks (New Bedford Standard). Southern Mill Stocks—Average price 25 Southern Cotton Mill Stocks (R. S. Dickson & Co.).

downward trend continue, it is likely to more than offset the abnormal volume of the automobile business as a business factor.

Depression in Textile Trade Continues

Mr. Mellon was undoubtedly right when he recently classed the textile industry as one of the unprosperous lines and said that its lack of prosperity is due chiefly to over-capacity. The combined activity of textile machinery in the cotton, wool, and silk manufacturing industries fell in July to the lowest level since August, 1924. Cotton manufacturing was the lowest since the middle of 1924; wool manufacturing has held near the low level reached in the same period and again in the middle of 1926; silk manufacturing activity was a little higher, but only about average for the years 1922-1926. In the case of the silk industry, however, prices are so low that the *value* of the manufactured output was probably the lowest since the 1924 depression.

The fact that textile prices are so low and the textile manufacturers' margins are so small in spite of curtailment of production, shows how great the over-capacity is. The country's needs for textiles can nowadays be met with the machinery working only part time. That the demand is weak in comparison with the supply, is proved.

The unfortunate combination of small activity and continued low prices naturally means a small total value for the textile products manufactured and a low volume of total sales. The trend of this figure is illustrated in an accompanying chart which shows that ***the estimated total value of textile products in recent months has been the lowest since 1921. Wholesale dry goods sales, while they have recovered a little bit, fell in April to a point almost exactly the same, considering the season, as in February, 1922. This is depression.***

But, as we see it, the situation now differs from the period of recession that began in the fall of 1927. ***It is not getting worse.*** For one thing, trade as reflected in department store sales gained in August and on the whole has shown improvement since April. This probably indicates that the sales of textiles at retail have improved and they are certainly larger than in August, 1924. For another thing, wholesale dry goods sales have not fallen as low relatively as textile production and showed a slight gain in July. Again, our estimate of the total value of textile production in recent months has not fallen as low as the physical output of textiles, which suggests that the prices of manufactured textile products are a little firmer on the average. Finally, textile production has for several months been relatively low in comparison with both department store sales and wholesale dry goods sales. ***These things together seem to mean that the time is gradually approaching when stocks of goods and yarns will be sufficiently reduced to allow a little better operating margins for the manufacturers.***

In some cases, too, a little larger volume of production may be justified before long. The danger will remain, however, that textile manufacturers may step their outputs up too rapidly.

Poor Earnings Indicated for Cotton and Wool Manufacturers

A further general decline in cotton mill securities occurred in August. Our index of southern mill securities for that month averages 125 against 128.8 in July, and the index of New Bedford mill stocks averaged about 58 against 60.4 in the preceding month. These are the lowest monthly averages of cotton mill stocks since the latter part of 1922. The reason is fairly clear. Manufacturers' margins are averaging too low to allow profitable operation and at the same time the consumption of cotton by the mills has fallen to the lowest levels since 1924. As a result, ***the earnings statements for July and August are likely to make a bad showing for the average cotton mill. Manufacturers' margins, however, have shown a little improvement recently, the prices of cotton textiles holding somewhat better than the price of raw cotton; but no satisfactory condition is yet visible, and holders of cotton mill stocks evidently will have to wait a good while for any sustained improvement in their securities.***

In the case of wool manufacturing, the margins of the cloth producers are practically unchanged. Apparently, if we allow for the usual lag between the purchase of wool and its manufacture, as well as for labor and fuel prices, these margins are the lowest since early 1926. A gain in the margins of worsted yarn spinners, figured on a replacement basis, is probably the exception. The margins are not adequate for profitable operation. Furthermore, the volume of production, whether measured by mill consumption or machinery activity, reached a new low level for the year in July. ***Thus the estimated earnings of the average wool manufacturing establishment were probably in the red, and their showing for the summer of 1928 will probably be no better than the first half of 1926.*** Nor is any turn yet definitely in sight.

Wool common stocks, according to our index, averaged 26.1 in August, against 26.5 in July and 37.9 a year ago. The decline in our index is due to the lower average for American Woolen common.

N. Bedford School Opens

Registration Approaches Last Year Despite Effects of Strike

NEW BEDFORD, MASS.—Despite the unsettled nature of the textile industry, especially in this city, the enrollment in the day classes at the New Bedford Textile School is well up to the average, and exceeds the anticipations of the management. With a number of the students having moved out of the city, along with their parents, during the strike, it was expected that the entering number this year would be considerably lower than the figures of last year, when the number was 80.

The enrollment during the first week totaled 73, and this number is likely to be increased, judged by the number of inquiries received by the school since the sessions got under way. One of the additional features at the school this year will be the weaving of all-rayon fabrics. In the past, weaving in rayon goods has been confined to construction with only the filling of chemical fiber. This policy is in keeping with the desire of the school to adapt itself to the newest manufacturing trends in the textile industry, announced Principal William Smith.

Several additions to the equipment of the school have been made during the summer, and more is being installed at the present time. A women's fine gauge hose device and a jacquard machine for men's hose have been added to the knitting department, and in the weaving department four new automatic looms are to take the place of four old ones.

During the summer, two new automatic box looms were installed. In the designing department, the students are to be given more opportunities for originality than in the past. Instead of being given cloth from which to create their designs, the process of copying, the students will be required to use their imagination and devise their own patterns. This emphasis upon originality, said Mr. Smith, will be extended throughout the school, where possible.

Mr. Smith announced that with two exceptions, all the members of the graduating class of last June have obtained connections in the textile industry, most of them of a promising nature. Theodore E. Carlson, highest ranking student last June, and winner of the Manufacturers' medal, is at present in Europe completing a tour, a graduating gift of his parents, but will become associated with a large textile corporation on his return.

Bradford-Durfee School Opens with Same Enrollment as 1927

FALL RIVER, MASS.—The Bradford Durfee Textile School opened on Monday morning for the school year 1928-29 with a full enrollment. As in the past, it is expected that a number of additional students will report during the next two weeks during which time the registration will remain open.

The number of students entering this year equals last year's enrollment and is pleasing to the school authorities.

The faculty of the school remains the same as last year but for one change, that of Walter E. Marston, of this city, who takes the place of Sidney Springer who resigned to accept a position in New York city. Mr. Marston is a graduate of the school and has had practical experience in the textile industry since his graduation.

Philadelphia School Opens for 45th Year

PHILADELPHIA.—The 45th year of the Philadelphia Textile School officially started Sept. 19, although the first year students entered the school two days earlier. Night classes as usual will not open until Oct. 8, several weeks later than day classes. Director France of the school anticipates an enrollment at least as large as last year which included students from most the States of the Union with a large representation from South American and Far East countries. There have been no important changes in the teaching staff which includes many of the foremost authorities of their particular line.

Director France has been recognized as one of the leading educators in the textile field and his value to the industry is being more generally understood from year to year. His influence on the large number of students that have received instruction from him through many years of service and his instruction of the present student body carry his authoritative knowledge of textiles into many sections of the world.

The staff of the school is as follows:

E. W. France, Director, Lecturer on Raw Materials, Processes and Fabrics.
Bradley C. Algeo, Asst. Director, Professor in Charge of Weave Formation, Analysis and Structure of Fabrics.
Frank L. Giese, Instructor in Weave Formation, Analysis and Structure of Fabrics.
Richard S. Cox, Professor in Charge of Jacquard Design, Drawing and Color Work.
Ercal Kaiser, Instructor in Jacquard Design and Color Work.
Ralph Dunkelberger, Instructor in Free Hand Drawing and Figured Design.
Elmer C. Bertolet, Professor in Charge of Chemistry, Dyeing and Printing.
Howard A. Walter, Assistant Professor in Charge of Chemistry and Dyeing.
Percival Theel, Instructor in Dyeing and Chemistry.
Joseph E. Goodavage, Instructor in Dyeing, Bleaching and Printing.
George G. Byler, Instructor in Elementary Chemistry.
John Lockwood, Instructor in Charge of Wool Carding and Spinning, Worsted Drawing and Spinning.
Alan G. Marquart, Assistant in Wool Carding and Spinning, Worsted Drawing and Spinning.
John Naab, Instructor in Charge of Cotton Carding and Spinning, Silk Manufacturing and Hosiery Knitting.
Wm. B. Williamson, Assistant Instructor in Cotton Carding and Spinning and Hosiery Knitting.
William Pfeiffer, Instructor in Charge of Power Weaving and Related Branches.
Ervin Wilmer, Robert J. Riley, Assistants in Power Weaving and Related Branches.
Wm. A. McLain, Instructor in Charge of Elementary Weaving and Related Branches.
John W. France, Assistant in Elementary Weaving and Related Branches.
Frederick Jennings, Instructor in Materials Used in the Wool and Worsted Industry.
Anna C. Krecker, Secretary.
Thomas H. Willson, Registrar.

WITH THE EDITORS THIS WEEK

Editors: Charles H. Clark, Vernon E. Carroll, Clarence Hutton, Douglas G. Woolf — *We Believe in the Conservation and Protection of Domestic Industries*

Not a "Labor Problem"

NO thinking man sees in our present stage of intensive civilization and progress, an unmixed blessing. Neither can any thinking man project himself into the future without recognizing the potentiality of even graver problems as the complexity of our industrialism increases.

We face the necessity of continual adjustment between production and consumption as new and higher rates of manufacturing efficiency are achieved, and as new demands for better standards of living are developed.

This prospect involves no "labor problem" as such. It carries with it a mutuality of interest between employers and employes which will become more clearly defined as time goes on. This remark should not be interpreted as implying that management and workers can ever have the identical point of view. Such a thought would be as silly as the idea that buyer and seller can ever hold the same "hand" in the game they play. In each case, there is a competitive spirit which will last as long as man's trading instincts persevere.

There is, however, no basis for a spirit of antagonism. Possibly in prehistoric times, when each man lived as an individual, there was no common meeting ground. As recently as the feudal era, the clean-cut distinction between master and serfs created two groups arrayed against each other as two opposing armies—but with the advantage all on one side.

Today, we are all parts of a complicated structure, the ramifications of which involve us all in the same degree. The slightest change in the balance between production and consumption affects both employers and employes in the industry concerned; and at the same time affects, indirectly but very concretely, employers and employes in hundreds of other businesses and industries.

There are undoubtedly some who would like to see a return to the "simple life." Fortunately or unfortunately, according to one's point of view, that is impossible. Our feet are set on the path toward higher levels of industrial achievement. Our one problem is to so strengthen our economic structure that it will support employer and employe in the attempt of each to secure the maximum fulfillment of his ideals and aspirations.

* * *

It was this thought that Herbert Hoover had in mind when he stated in Newark, Monday of this week:

> "Our economic system has abuses; it has grave faults in its operation. But we can build toward perfection only upon a foundation of prosperity."

Mr. Hoover needs to offer no defense of his attitude toward the problems of the employed classes. His efforts toward elimination of unemployment; his support of the tariff as protection to both capital and workers; his intelligent views on immigration; his program for the elimination of waste in industry; his activity in behalf of increasing our foreign trade — are all positive reflections of his sympathetic interest.

But in all these undertakings he has not posed — nor does he pose now, even though a political candidate — as a "champion of labor." His attitude toward economic problems is that of an impartial student who recognizes no class or no group whose interests are paramount to those of any other class or group.

Standing firmly for the principle of collective bargaining, he nevertheless looks ahead to the time when industrial conflict will have been reduced to a minimum. He sees the great progress which has been made in employer-employe relations during recent years but he knows that much more has to be accomplished before the principle of mutuality of interest is employed to the fullest extent.

His plea for the assurance of the ability and character of our leadership represents the broadest and most constructive key to the solution of our industrial problems. He indicated how that leadership can be found. The last four paragraphs of his Newark address form the answer to all our doubts as to the end-point of our complicated industrialism.

Once more Mr. Hoover refrained from making a political speech. Nothing he said was of the type to raise his audience out of their seats in a fervor of partisan frenzy. He gave no opportunity for an orgy of hat-throwing and cheering. But he gave to every individual in this country a new vision of the opportunities and responsibilities involved in our present economic system.

THE TEXTILE TREND

Cotton Markets: Progress is being made in cotton goods despite lack of support from the raw material. Many lines have been reduced in price and much selling accomplished on new basis. Buyers show more confidence than usual on a declining market indicating belief that bottom is near at hand. Chambrays reduced. Wash goods business expanding. Blankets slow. Duck mills curtailing. Print cloths sell for next three months.

Wool Markets: Heated activity following concentrated opening of men's wear is cooling off. Trade spotty, with some houses well sold and others neglected. Buyers suggest opening different classes of goods with breathing space between them. Spot demand for women's wear better and stocks seem low. Other important openings for spring expected soon. Hope for better season. Lack of interest in worsted yarns; prices continue fairly steady; spinners curtailing.

Knit Goods: Conservative trend in half hose. Originality demanded in fancies, not merely startling effects. Trade discusses need for variety of lengths in women's hosiery. Some lines called too long. Around 29 inches considered fair enough but old standard of 27½ inches is now called too short. Underwear men find trade slow, but believe early cool weather will draw rush of orders. Pull-overs called good for next spring.

Silk Markets: Market for broadsilks begins to show effect of continued dullness. Satins for example are reported irregular in price. Some other lines must be curtailed unless orders increase. Transparent velvets, however, are well sold. New call is chiefly for novelties. Ribbons have improved greatly in last month and as they are backed by several new vogues their future is distinctly better.

A Stabilizing Decline

IT is true that the decline of five to seven and a half per cent in greasy merino and crossbred wools at the opening of the September series of London sales last Tuesday merely carried the prices of spot wools in that market to the basis established between sales on wools in primary markets and on tops in England and Continental countries. It is, therefore, interpreted by dealers in this country as tending to stabilize values at the lower levels previously established. Whether or not that assumption is correct will be demonstrated by the course of values during succeeding days of the series, and by the reaction to them of primary markets and of topmakers and spinners.

Such effect as it may have upon wools and their manufactures in domestic markets will be largely psychological. It will not make it possible to lay down in this country foreign merino and crossbred wools sufficiently cheaper to make them competitive with domestic wools at current prices. Inside of our wool tariff wall the demand and supply situation has not been materially changed, and therefore, no price changes may be expected to be influenced thereby, unless the psychological effect of the recent downward trend of wool prices abroad influences users of cloths, yarns and tops to restrict purchases very materially.

As it would seem impossible for clothiers and jobbers to restrict their takings of cloths below recent abnormal minimums, it would seem safe to assume that values of fine wools will remain stable at least, and that those of medium wools may harden somewhat.

Convalescence

THERE is no more dangerous period in the life of a once robust man who has suffered a major operation or a protracted serious sickness than that of convalescence; unconscious of his physical weakness and feeling the urge to be up and doing there is constant danger of over-exertion that will result in a relapse from which recovery is likely to be slower and more difficult than from the original sickness.

There are encouraging indications that the cotton textile industry is now convalescing

from one of the most serious attacks of acute indigestion that it has ever suffered, and there are also indications that certain individual units of this once robust body are jeopardizing its complete recovery by exertion that only the most vigorous constitution could endure. These units of a great industrial body seem unable to understand that permanent health of the industry is dependent upon continued cooperation of every important unit, and that there is greater incentive to such cooperation while the industry is convalescing than when it was flat on its back and being subjected to the bloodletting and purging of curtailment.

The 16.7 per cent increase in cotton consumption of August over July, and the figures of the Cotton-Textile Merchants Association showing a substantial increase in sales and unfilled orders, are convincing indications that a convalescent period has been entered upon, but it is strongly to be doubted whether any industrial doctor would advise such a radical increase in activity as is indicated by the August consumption figures while stocks of manufactured goods remain so much larger than the average of the last six or twelve months. It is true that cotton consumption during August was 16.9 per cent smaller than during August of last year, but as compared with the much lower activity of July and June it has dangerous possibilities for the convalescent.

It is possible, of course, that present unexpectedly low raw cotton prices will prove a greater aid to the patient's recovery than could have been anticipated a few months ago, but we believe that everybody would feel more certain as to the permanency of the recovery if the patient could be subjected to the drastic blood-letting and purging that seems necessary to get rid of abnormal stock accumulations. However, if every member of the industry will remember that it is still in the hospital and requires the tenderest care during its convalescence there is every reason to believe that by Thanksgiving there will be ample cause to give thanks and that by Christmas the patient may have enough profits in sight to feel like sitting up and making merry.

Spinners' Field Day

Program Announced Includes Outdoor Sports and a Dinner

PHILADELPHIA.—Many novel features have been arranged for the annual outing to be held at the Manufacturers Country Club, Oreland, Pa., Sept. 26 by the National Association of Worsted & Woolen Spinners and the Entertainment Committee believes the day will prove to be especially interesting and enjoyable to those attending. Acceptances received to date indicate that it will be one of the largest meetings of worsted spinners held under the auspices of this organization.

Automobiles will meet the Boston sleeper arriving at North Philadelphia station at 7.36 a. m. and the 8 a. m. Pennsylvania from New York. Cars will be parked in the circle at North Philadelphia to take out-of-town guests direct to the club without entering the central city traffic congestion.

A complete program for the day has been scheduled and activities will get under way at 9 o'clock when golf matches for the President's cup will start. Many attractive prizes have been secured and members not able to break 100 will be suitably rewarded as well as the more expert golfers, under the plan announced by the Golf Committee.

At 10 o'clock a tennis-ball golf match will be played and the present champions, John Hosey and John Harrigan, have announced they will challenge the winners. John Hosey in recent practice matches has made the tennis ball do tricks which, Joe Kirkwood had previously considered impossible. Luncheon will be served at noon and at 2.30 an exhibition golf match between Sherwood Hicks and Joe Rousseau will be played. This match is creating widespread interest throughout the spinning trade and one of the largest textile galleries to witness a match is expected to follow this play.

In the afternoon a base-ball game played between Boston and Philadelphia teams is scheduled and at 4 o'clock an archery contest will be held. In the late afternoon horse shoe throwing is on the program and a special match between Fred Wolstenholme and Louis Galle will be watched. These two players have announced that upon completion of their exhibition match they will, as a team, challenge any two players in attendance. Dinner will be served at 6.15 p. m. and for this event the committee has a number of other surprises in store.

ANNUAL WOOLEN AND WORSTED ASS'N MEETING ON DEC. 5

The 22d annual meeting and banquet of the American Association of Woolen and Worsted Manufacturers will be held Dec. 5 at the Waldorf-Astoria, New York. Details of the meeting and dinner have not yet been determined.

Notice of the event is being sent out, accompanied by a request to those receiving it to make note of the date and record reservations early.

Greenville Exposition to Have Cotton Field on Display

GREENVILLE, S. C.—Northern visitors to the Southern Textile Exposition, which will be held here Oct. 15 to 20, will be greatly interested in the "cotton field" in rear of the Annex. Last spring President W. G. Sirrine wrote to David R. Coker, the world famous grower of pedigreed cotton seed, and asked for some seed for Textile Hall. Mr. Coker generously sent a special lot of selected seed and these were planted in the rich soil of the "back yard." The cotton has grown luxuriantly and the bolls will be bursting with the snowy staple when the Exposition is opened.

All the space having been sold the management gave an order in New York today for two large wall directories. These will be placed conspicuously at each of the entrances to the buildings.

Thirty-five hundred invitations are now being addressed to southern cotton manufacturers and their associates. Complimentary season passes will be sent with them.

Greenville promises unusual hospitality during the forthcoming show. All of the rooms in the seven hotels having been taken long ago, hundreds of Greenville home owners have placed their spare rooms at the disposition of the reservation committee, which is now booking definite accommodations for Textile Week.

Further Efforts to Settle New Bedford Strike

NEW BEDFORD, MASS.—Following several days of optimism that the end of the textile strike appeared in sight, these hopes received somewhat of a setback with the official reply of the New Bedford Cotton Manufacturers' Association to an "important" communication from the Citizens' Mediation Committee, in which it was stated by the manufacturers that the so-called labor specialization plan was unacceptable to them. This plan, acceptable to labor leaders if work was resumed at the old wage scale, and subject to ratification by the respective unions, was the basis on which the community was hoping would provide a basis for settlement of the controversy that is now in its 23rd week.

A compromise plan suggesting a reduction of 5% in wages has been presented by Mayhew R. Hitch, judge of Probate Court, coupled with the adoption of the labor specialization plan, while another plan presented by William C. Prescott, treasurer of the Kidder Company of this city, director of the Page Mill, and son of Oliver Prescott, head of the Wamsutta Mills, recommends that the more modern mills of the city waive the wage cut and start up immediately.

The State Board of Conciliation and Arbitration has announced that it will make another visit to New Bedford to renew its efforts to find a basis of settlement.

Mr. Sullivan, in the reply of the manufacturers to the Mediation Committee, points out that the manufacturers "did not intend to close the door to further conversations," and it is expected that the Mediation Committee will make another effort to get the two parties together over a conference table.

Du Pont Obtains "Celta" Rights in U. S.

Du Pont Rayon Co., Inc., has secured the exclusive rights for the manufacture and sale of "Celta" hollow filament rayon in the United States, Canada and Mexico, according to announcement at the offices of that company Wednesday.

Until now "Celta" has been brought into this country by the New York Rayon Importing Co., Max Spinner, president. Actual transfer of the American sales rights, now held by New York Rayon, will take place Oct. 1, when that company will relinquish them.

"Celta" will continue to be imported indefinitely until such time as the company is ready to manufacture it here. This yarn has been made for a number of years in France by the Comptoir des Textiles Artificiels, who are the foreign associates of Du Pont Rayon Co.

Committees on Raw Silk Exchange Appointed

Appointment of 15 standing committees of the National Raw Silk Exchange was announced yesterday afternoon by Paolino Gerli, president of the exchange. The committees, to serve for the current fiscal year, are as follows:

Executive Committee—Jerome Lewine, chairman; Charles V. V. Smillie, William R. Craig, Douglas Walker, Paolino Gerli, ex-officio.

Finance—J. C. Cuppia, ex-officio, chairman; Paul A. Salembier, Charles Muller.

By-laws and Rules—Frederic D. Huntington, chairman; Jerome Lewine, F. R. Henderson, Charles V. V. Smillie, Paolino Gerli, ex-officio.

Grading and Warehousing—Charles Muller, chairman; Paolino Gerli, Ernest C. Geier, C. Walter Seidel, George A. Post, Thomas H. Bopp, Frederic C. Zanes, Charles V. V. Smillie, Frederic D. Huntington, H. Fujimura, George F. Fisher, Adolph J. Borner, S. Bruce Smart, H. Takei, Nathan Lewis.

Supervisory—Jerome Lewine, chairman; Paul A. Salembier, Frederic D. Huntington.

Commissions — August Schierenberg, F. R. Henderson, Nobusuke Egawa, Lionel F. Straus.

Adjustment—Charles V. V. Smillie, chairman; Louis Kahn, George A. Post, S. Taijima, Shataro Okumura, John D. Dunlop, Thomas, H. Bopp.

Quotations—George F. Mahe, chairman; A. R. Simon, Nelson Dougherty, William O. Strabler, Frank E. Kane.

Arbitration—Ernest C. Geier, chairman; John C. Botts, Leon B. Lowenstein, Simon Shlenker, Ralph Hubbard, A. D. Walker.

Board of Appeals—Herman B. Baruch, chairman; Paul Schwarz, James T. Bryan, Charles Cheney, Milton K. Yorks, Allan Macfarlan, Robert J. F. Schwarzenbach.

Business Conduct—F. R. Henderson, chairman; James A. Goldsmith, Henry Schnelwind, H. Morton Merriman, August Schierenberg.

Membership—Benj. Van Raalte, chairman; Allan Macfarlan, J. Mockley Potts, Alexander Blum, Benjamin B. Peabody.

Floor—Frederick C. Zanes, chairman; Frank E. Kane, Arthur B. Elliman, Seymour D. Pelz, Paul Elbogen.

Information and Statistics—Douglas Walker, chairman; George A. Post, S. Bruce Smart, Thomas H. Bopp, William O. Strahler.

Publicity—Paolino Gerli, chairman; Douglas Walker, Henry L. Gwalter.

Cannon Mills Co., Kannapolis, N. C., is having its new steam generating unit installed. Equipment has been purchased from Combustion Engineering Corp., and includes a 1,400 h.p. boiler. J. E. Sirrine & Co., Greenville, S. C., are the engineers.

Hosiery Rate Hearing Held

Disparity of Freights from Southern Points to and from Chicago

ATLANTA, GA.—Hearings to determine whether or not the proposed new rates on hosiery from southern points to the Chicago and mid-western markets shall be put in force opened here on Sept. 17 at the Atlanta-Biltmore hotel before Examiners Glenn and Hill of the Interstate Commerce Commission.

The hearings, which will occupy three or four days, grew out of a complaint filed with the Interstate Commerce Commission by the Bear Brand Hosiery Co., of Kankakee, Ill.

Some months ago the Bear Brand Hosiery Co. discovered that its rate on hosiery to Atlanta and other southern points was about 50c higher than the rate from Atlanta to Chicago. It at once filed a complaint with the commission, in which it stated that the discrepancy in rates made it impossible for it to enter into fair competition with merchants in the South and at the same time enabled southern shippers to enter the Chicago market at lower prices than it could afford.

After hearing the complaint, the Interstate Commerce Commission revised the rates from southern points to Chicago in order to equalize the rates to Chicago from the South as well as from the East and West.

This revision was at once protested by the southern manufacturers and shippers of hosiery, of course, and as a result the commission suspended the proposed new rates until a hearing on the subject could be held and both sides heard before rendering a final decision.

In the testimony offered today, representatives of the railroads credited the difference in the rate north and south between the South and the Chicago market to two things—failure of the southern roads to take advantage of certain increases in rates allowed and the retention of old commodity rates between Atlanta and Chicago.

It was pointed out that the eastern roads have been, from time to time, allowed increases in hosiery rates amounting to about 40%, while the southern roads have increased their rates only about 25%. It is this difference, they say, which makes the rate from Atlanta to Chicago lower than that from Chicago to Atlanta, and gives the southern shipper an unfair advantage.

Then, too, most of the rates from the East and West to Chicago are first class rates, while from the South the old-time commodity rates obtain.

In short, the railroads contend that a revision upward is only fair and will equalize the cost of getting hosiery to the Chicago market and from it, while the shippers contended on Wednesday that the present rates are fair and ought to be kept in force.

The evidence taken will be considered carefully by the commission, and it will probably be several weeks before a final decision is rendered.

Plan Exchange for Cotton Products

Cloths, Yarns, Wastes as Well as Raw Cotton in Scope of New Body

THE National Cotton Exchange, Inc., is a body in process of organization in New York, which proposes to trade in raw cotton, cotton seed oil, cotton linters, gray goods, cotton yarns, cotton wastes, etc. The plan calls for a limit of 1000 members, of which memberships a portion has been allotted for immediate sale.

Contracts for future delivery of raw cotton will be for 25, 50 and 100 bale lots, of cotton linters, 50 and 100 bale lots, of cotton seed oil 25, 50 and 100 barrel lots, of gray goods 1000 piece lots and of cotton yarns 10,000 lb. lots or 100 warps.

Louis Osmond and Eugene Williams are the sponsors of the exchange. They believe that the contracts offered on goods, yarns and wastes will be a contribution toward solving the problem of hedging purchases and sales of such commodities.

Purposes of Exchange

The National Cotton Exchange is a membership corporation, organized under the laws of the State of New York. The charter creating this exchange was filed on July 25, 1928. In that charter, the purposes for which the exchange was formed, are set forth as follows:

"To foster and augment the cotton industry, and the production, trade and exchange of raw cotton and its natural and manufactured by-products, for the weal of those having an interest therein; and for the promotion of such ends;—to provide, regulate and maintain an Exchange, and furnish facilities to its Members for the purchase, sale, barter or exchange of raw cotton and its said natural and manufactured by-products, including cotton seed oil, cotton linters, and cotton in its various states of manufacture, etc.; to establish just and equitable principles in the business conducted by and between its members; to procure uniformity and certainty in the customs and usages of the trade; to formulate, promulgate and enforce Rules and Regulations, and Standards of Classification; to arbitrate and settle finally, differences which may arise between its Members and others; to engender an enlarged and friendlier intercourse between persons interested in the said industry; to acquire, preserve and diffuse information, both useful and reliable, in connection with the industry, the growers, dealers and manufacturers all over the world; to decrease risks attendant upon the said business; to reform abuses relative to the industry, and generally to promote and facilitate any and all of the aforesaid objects."

The Gray Goods Contract Committee of the National Cotton Exchange, New York City, have announced this week that they have completed their form of contract for future trading in cotton gray goods.

For some time there has been consideration of the need for an exchange which offered facilities for dealing in gray goods future contracts. Due to distortions of relationship of prices between raw cotton and the gray goods market, a certain hedge has been difficult to secure, but the individuals behind this proposed exchange believe that accurate hedging will be possible, by trading in future gray goods contracts.

Special committees are now engaged in perfecting contracts for future trading in cotton yarns and linters.

Gray Goods Contract

The exchange has the following to say regarding the proposed gray goods futures contract:

Deliveries of Print Cloths, Sheetings, etc., shall be made under three Classifications, viz. A, B and C in the various numbers and descriptions or constructions, and shall be divided into five groups, as follows:

Group 1, representing eight numbers of *Print Cloths.*
Group 2, representing ten numbers of *Sheetings.*
Group 3, representing two constructions of *Osnaburgs.*
Group 4, representing five constructions of *Drills.*
Group 5, representing one description of *Denims.*

The following constitute the various descriptions of each group that shall be traded in and form of contract established for upon the Exchange:

Group 1 — *Print Cloths:*

27 inch	64 x 60	7.60 yards	per pound
38½ in.	44 x 40	8.20 yards	per pound
38½ in.	48 x 48	7.15 yards	per pound
38½ in.	60 x 48	6.25 yards	per pound
38½ in.	64 x 60	5.35 yards	per pound
39 inch	68 x 72	4.75 yards	per pound
39 inch	80 x 80	4.00 yards	per pound
44 inch	48 x 48	6.40 yards	per poun.

Group 2 — *Sheetings:*

36 inch	40 x 40	6.15 yards	per pound
36 inch	48 x 40	5.50 yards	per pound
36 inch	48 x 48	5.00 yards	per pound
37 inch	48 x 48	4.00 yards	per pound
36 inch	48 x 44	3.25 yards	per pound
36 inch	48 x 48	3.00 yards	per pound
40 inch	48 x 48	2.50 yards	per pound
40 inch	48 x 48	2.85 yards	per pound
40 inch	48 x 44	3.75 yards	per pound
40 inch	44 x 40	4.25 yards	per pound

Group 3 — *Osnaburgs:*

30 inch 7 ounce P.W. (High Count)
40 inch 7 ounce P.W.

Group 4 — *Drills:*

37 inch	3.95 yards	per pound
37 inch	2.75 yards	per pound
30 inch	3.25 yards	per pound
30 inch	3.00 yards	per pound
30 inch	2.50 yards	per pound

Group 5 — *Denims:*
2.20 yards per pound.

The Contract for each construction in the various Groups shall constitute One Thousand (1000) pieces, and there shall be a weight variation allowance of 2% on each contract.

Standard Types shall be established by the Exchange representing the several classes of A, B and C in each group, that is, there shall be three grades established for each construction in each group, and all contracts traded in must stipulate the number of the Class as well as the description and construction of the goods concerned, as represented by the Type Standards which will govern all transactions between Buyer and Seller, and each confirmation of purchase or sale exchanged between Buyer and Seller shall bear the following data:

1: Number, construction and yardage per pound.
2: Whether Class A, B or C.
3: Price per yard.
4: Number of pieces (to be not less than 1000 or multiples thereof).
5: Date of delivery.
6. Date on which contract is executed.
7: Specify: "This contract is subject to the Rules, Regulations and By-Laws of the National Cotton Exchange governing all transactions in Gray Goods, etc., etc.

Deliveries: All deliveries will be made ex Warehouse, New York, warehouses to be licensed by the Exchange, to be designated later.

Cotton Yarn Futures

The proposed grouping of yarn counts for the National Cotton Exchange's cotton yarn futures contract is as follows:

Group 1: Southern 2-Ply Warps — White Standard Descriptions

30s	5.00c	premium
26s	3.00c	premium
24s	2.00c	premium
20s	Basis	
16s	1.00c	discount
14s	1.50c	discount
12s	2.00c	discount
10s	2.50c	discount

Contract 100 Warps Theoretical Weight. Variation in weight allowed 3%.

Group 2: Frame Spun Carded Hosiery Yarn — White, on Cones

30s	6.50c	premium
28s	5.50c	premium
26s	4.50c	premium
24s	3.75c	premium
22s	3.00c	premium
20s	2.50c	premium
18s	2.00c	premium
16s	1.50c	premium
14s	1.00c	premium
13s	.75c	premium
12s	.50c	premium
11s	.25c	premium
8s, 9s and 10s	Basis	

Contract 10,000 pounds. Variation weight allowed 3%. Allowance for Cones 2%.

Group 3: 2-Ply Carded Skeins — 54 inch Reel, 4 and 6 ounce Skeins.

40s	11.00c	premium
30s	4.00c	premium
26s	3.00c	premium
24s	2.00c	premium
20s	Basis	
16s	1.00c	discount
14s	1.50c	discount
12s	2.00c	discount
10s	2.50c	discount

Contract 10,000 pounds. Variation weight allowed 3%.

Group 4: 2-Ply Combed Peeler Mercerizing Twist Warps
Standard Description

68s	24.00c	premium
58s	14.00c	premium
48s	6.00c	premium
38s	Basis	
28s	5.00c	discount
19s	10.00c	discount

All of the above mentioned Yarns to be of Standard Description, for each of which Type Standards shall be established by the Exchange, governing all transactions.

Deliveries: Ex-warehouse New York, in warehouses to be licensed by the Exchange, to be designated later.

Proposed Linter Contract

The National Cotton Exchange, Inc., has the following to say regarding the proposed linter contract:

The Linter Contract will be predicated upon regular Standard Types; samples are now being obtained in 15 pound sacks, of all grades made by various mills representing the production of some 500 mills, and when these samples have been assembled together, Standard Types will be carefully prepared and selected therefrom along the following lines:

There shall be established a Texas-Oklahoma-Arkansas group, comprising seven (7) regular Standard Types, as representative of this particular group, and deliveries will be interchangeable; that is, deliveries can be made against the contract comprising this group if equal to the type, by mills located in the respective states of Texas, Oklahoma and Arkansas at the option of the seller.

There shall also be a Mississippi-Louisiana group, comprising seven (7) regular Standard Types, along the same lines as established in the Texas-Oklahoma-Arkansas group, and in addition thereto there is to be a special type for Mississippi growth to cover the requirements of the rayon trade, the latter type shall be known as a Rayon type.

Further, there will be established an Atlantic group comprising Alabama-Georgia-North Carolina-South Carolina productions, which group shall likewise be composed of seven (7) regular Standard Types, with one special type covering the requirements of the Rayon Trade.

It is believed that these three (3) groups of standards will practically cover general requirements of the Linter Tade, but in order to make the contract as elastic and comprehensive as possible, there is also to be established an additional set of six (6) Standard Types, to be adopted into each one of the groups, already referred to, which types shall be known under the general description as follows:

"Trashy."
"Dirty."
"Brighter in Color."
"Duller in Color."
"Longer in Staple."
"Shorter in Staple."

Proper premiums shall also be established, subject to revision from time to time, in the judgment of the Revision Committee, for staple and color.

The regular seven (7) Standard Types will be known by suitable appellations, names, or designations to be selected later and set forth under such descriptions in the contract covering the following general descriptions:

1. Type first cuts (color and staple).
2. Type first cuts (irregular in color and staple).
3. Type mill run.
4. Type mill run.
5. Type mill run.
6. Type second cuts (color and staple).
7. Type second cuts (poor color and short staple).

A common basis shall be selected as represented by one of these types from each group and the qualities above and below the type so selected shall be regulated by differences on or off of the basic types, such differences to be subject to revision from time to time as warranted by actual trade conditions.

THE PERSONAL PAGE

Dr. Jacques C. Hartogs, president of the American Enka Corp. and its parent company, N. V. Nederlandsche Kunstzidefabriek Enka, and managing director of British Enka Artificial Silk Co., has had conferred upon him the title of the Chevalier of the Order of the Netherlands Lion by Her Majesty, Queen Wilhelmina, of the Netherlands, in recognition of his services in the promotion of industry in Holland.

Sigmund Odenheimer, president of the Lane Cotton Mills, New Orleans, La., has been elected vice-president of the Audubon Park Commission.

Hiram Rivitz, president; **Frederick C. Niederhauser,** vice president in charge of technical operations, and **Henry Beckerman,** a director of the Industrial Rayon Corp., Cleveland, Ohio, with **Dr. E. C. Worden,** cellulose expert and consultant, of Milburn, N. J., expect to sail from New York this week for a 4 or 5 weeks' business trip to Europe. It is understood that most of the time will be spent in France and Germany.

Edward F. Rice, president and treasurer of the Holbrook Mills Co., Millbury, Mass., has been elected treasurer of the Millbury Cooperative Bank.

John Wilcock, president of the Barre Wool Combing Co., Ltd., South Barre, Mass., and Mrs. Wilcock, sailed from Boston on the S. S. Scythia on Sept. 13 for a European trip.

M. Whitin Whittall, of the M. J. Whittall Associates Ltd., Worcester, Mass., arrived in Los Angeles, Cal., 12th in Class B in the transcontinental air race. He will return by train.

Charles J. Webb, Chas. J. Webb & Sons Co., Inc., Philadelphia, has been appointed member of the Philadelphia Business Progress Committee, under whose auspices a campaign to regularize business and employment in that city will be carried on.

Van Court Carwithin, Philadelphia, who died last November, left an estate appraised at $804,120, according to an accounting filed with the registrar of wills. The estate was willed to his widow, two children and his mother.

John E. White, former president of the Graton & Knight Co., Worcester, Mass., and Mrs. White, sailed from New York on Sept. 14 on the S. S. Majestic for a 2 months auto tour of Europe.

L. N. Littauer, president of the Gloversville (N. Y.) Knitting Co., has donated to the mill employes of that city a community swimming pool.

F. L. Carlisle has succeeded **H. E. Machold** as president of the Northeastern Power Corp., Watertown, N. Y. Mr. Machold, recently elected head of the Republican State Committee, will retain his position as vice-president of the Skenandoa Rayon Corp., Utica, N. Y.

Henry G. Simmons has been made assistant treasurer of Pacific Mills, Lawrence, Mass. He has been with the organization for about ten years.

J. F. Greene, president of the Ford Mfg. Co., Waterford, N. Y., and family, have returned from a stay at the family summer home in the Thousand Islands.

Herbert K. Webb, Chas. J. Webb & Sons Co., Inc., and **Fred A. Rakestraw,** Hyde, Rakestraw Co., Philadelphia are listed among the prominent business men of that city named to raise funds in the annual drive of the Welfare Federation.

Paolino Gerli, president of National Raw Silk Exchange on left, and Jerome Lewine, vice-president, with bale of raw silk donated by Mr. Gerli and auctioned off before the opening of the exchange last week

Wm. G. Davidson, Wm. G. Davidson & Co., Inc., Philadelphia, sailed for Europe Sept. 7 and plans to spend several weeks touring on the continent and in England.

J. W. Landenberger, Sr., head of J. W. Landenberger & Co., Philadelphia, has returned from a trip through Europe where he made a comprehensive study of children's hosiery styles.

Sterling H. Thomas and **Frank H. Thomas,** of Standard-Trump Bros. Machine Co., Wilmington, Del., sailed Sept. 8 on the S. S. Columbus for Europe, where they will visit the foreign offices of their company. They plan to spend a number of weeks in the leading knitting sections of the continent. Frank H. Thomas upon the completion of the European tour will sail directly from Europe for South America, where he expects to spend several months. He will devote a large portion of the time there visiting various offices of his concern in the Latin American countries.

Herbert E. Hyman, who went to Europe 11 months ago to systematize merchandising there for the Keystone Knitting Mills, a subsidiary of the Real Silk Hosiery Mills, Indianapolis, Ind., has just returned home. He said that two of the brightest spots in Europe were Poland and Czechoslovakia, where industry and business were forging ahead.

Gustave Geiges, Philadelphia, was re-elected president of the American Federation of Full Fashioned Hosiery Workers at its annual convention recently held in Philadelphia and William Smith was chosen secretary-treasurer.

J. J. Murphy, treasurer of the United Waste Mfg. Co., Cohoes, N. Y., has been selected as a delegate to the coming Democratic State Convention.

Edward J. Ross, chief raw silk inspector of Kahn & Feldman, silk throwsters, New York, is recuperating at the home of his parents in New Bedford Mass., after undergoing an operation and is expected to resume his duties Sept. 25.

J. D. Loner has been selected as superintendent of the Saratoga Victory Mills at Guntersville and Albertville Ala., on which work has been started He will take up his new duties this month. Mr. Loner has been connected with the Dwight Mfg. Co., Alabama City, Ala., for 21 years.

S. L. Bolton is now superintendent at the Alabama Mills Co., Haleyville, Ala.

A. B. McCormick, formerly superintendent of the Yarborough Mills, Inc., Durham, N. C., has resigned to accept a similar position with A. Schottland, Inc., Rocky Mount, N. C.

TEXTILE CALENDAR

National Association of Worsted and Woolen Spinners, Eighth Annual Field Day, Manufacturers Country Club, Oreland, Pa., Sept. 26, 1928.

Textile Section, National Safety Council, Meeting, Pennsylvania Hotel, New York, Oct. 2-3, 1928.

Texas Textile Association, Meeting, Waco, Texas, Oct. 5-6, 1928.

Eastern Carolina Division, Southern Textile Association Meeting, North Carolina State College, Raleigh, N. C., before Oct. 15, 1928 (date to be set later).

Committee D-13, A. S. T. M., Fall Meeting, Washington, D. C., Oct. 10-11, 1928.

Southern Textile Exposition, Textile Hall, Greenville, S. C., Oct. 15-20, 1928.

Master Mechanics Section, Southern Textile Association, Meeting, Greenville, S. C., Oct. 16, 1928.

Associated Industries of Massachusetts, 13th Annual Meeting, Copley Plaza and Brunswick Hotels, Boston, Mass., Oct. 17-18, 1928.

Textile Division, American Society of Mechanical Engineers, Second National Meeting, Greenville, S. C., Oct. 17, 1928.

Southern Textile Association, Semi-annual Meeting, Greenville, S. C., Oct. 19, 1928.

National Association of Cotton Manufacturers, Annual Meeting, Copley-Plaza Hotel, Boston, Mass., Oct. 24-25, 1928.

Associated Knit Underwear Manufacturers of America, Annual Meeting, Hotel Utica, Utica, N. Y., Nov. 14-16, 1928.

Dyers, Bleachers and Finishers Division, Southern Textile Association, Fall Meeting, Greenville, S. C., November, 1928 (date to be set later).

Power and Mechanical Engineering Exposition, Grand Central Palace, New York City, Dec. 3-8, 1928.

American Association of Woolen and Worsted Manufacturers, Annual Meeting and Banquet, Waldorf-Astoria, New York, Dec. 5, 1928.

Silk Association of America, 57th Annual Dinner, New York City, Jan. 17, 1929.

Knitting Arts Exposition, Commercial Museum, Philadelphia, April 15-19, 1929.

Twelfth Exposition of Chemical Industries, Grand Central Palace, New York City, May 6-11, 1929.

Obituary

William Whitman

William Whitman, president of the William Whitman Co., Inc., dry goods commission merchants, Boston, founder of the worsted industry in this country and dean of the New England Textile Industry, died at his home in Brookline, Mass., last Wednesday evening, after a lingering illness of nearly a year. He was born in Roundhill, Nova Scotia, May 9, 1842, and came to this country in 1856, securing a position as a clerk in the Boston Commission House, of James M. Beede, Richardson & Co. He became treasurer of the Arlington Woolen Mills, Lawrence, Mass., in 1867 and the enormous growth of the Arlington was largely due to his ability. In 1895, his interest in cotton manufacturing commenced to expand, and the Whitman, Manomet, Nonquitt and Nashawena Mills in New Bedford were founded by him. He also founded the Monomac and Katama mills in Lawrence and the Acadia Mills of that city, was formerly a department of the Arlington Mills. He was also interested in several southern mills. He was president of the National Association of Wool Manufacturers from 1888 to 1894, and again from 1904 to 1911, and from his earliest connection with the industry he was an ardent advocate of the protective tariff and an authority on tariff matters pertaining to the wool and cotton industries. He is survived by his widow and by four sons and two daughters. His sons, William, Jr., Malcolm, Eben and Hendricks are associated with the William Whitman Co., and his son in law, Franklin W. Hobbs, is president of the Arlington Mills and of the National Association of wool manufacturers.

News of Mr. Whitman's death reached this publication just as the issue was going to press. A more detailed sketch of Mr. Whitman's life and of his position in the textile industry will be published in the next issue.

How Warp-Knit Fabric Can Be Approximately Analyzed To Aid Duplication by Trial and Error

Required Details of Glove-Silk Fabric Made on Tricot and Milanese Machines

By R. Presgrave

OUR technical department has received several requests during recent months for information on the analysis of warp-knit fabric. One of these inquiries was referred to R. Presgrave, an authority on glove-silk manufacture, in order that he might use it for the basis of an article. In the resulting article, which is printed herewith, Mr. Presgrave points out that the analysis of warp-knit goods demands a reasonable acquaintance with the fabrics in order that such information as may be determined by the few tests possible can be intelligently balanced and correlated. He discusses the tests that can be made.

THE question makes specific mention of glove-silk fabrics, and these alone will be dealt with, forming, as they do, by far the largest single group of fabrics made on the tricot and milanese machines. The writer is not aware of any publication that takes up the subject in detail and, as a matter of fact, very few hard-and-fast rules can be laid down for the analysis of such fabrics, partly because the difficulty in raveling precludes obtaining a fair sample of yarn, and partly because two samples of cloth knitted under similar conditions may vary by reason of treatment after knitting.

However, analysis can demonstrate certain conditions which would produce a cloth closely approximating the given sample. All that would then be necessary would be to make minor mechanical adjustments by trial and error which would give an exact duplicate of the sample. But by mere analysis it would be almost impossible to lay down exact specifications as can be done with most woven goods. It is as well to note also that some working acquaintance with the fabrics and their method of manufacture is advisable, if not a necessity, before analysis is attempted.

Factors to Be Settled

Certain factors must be settled upon before the cloth can be pigeon-holed. In the main they are as follows:

1. Type of cloth (tricot or milanese).
2. Nature and size of yarns employed.
3. Distribution of the yarn on the warps and in the needles.
4. Type of stitch (which includes ratio between warp lengths and the number of bars used).
5. Gauge of machine.
6. Length of rack (called "quality" in the trade).
7. Ratio between finished width and knitted width.
8. Weight of a unit area.

Anyone having the slightest acquaintance with the fabrics can settle the first question immediately. The characteristic texture of the milanese cloth, with the yarn carried diagonally from selvedge to selvedge, is unmistakable, unless it might be confused with atlas from tricot machines, which is a similar stitch but has only a short zig-zag traverse revealed at once by the presence of transverse bars about ½ inch in width. Tricot fabrics with the yarn running longitudinally throughout are also easy to identify. Occasionally the novice confuses them with circular knit goods, but the absence of raveling in tricot should settle this point.

To determine the nature of the yarn is also very simple. Glove fabrics are almost always pure silk, and once in a while celanese. Weighted silk is sometimes found in European gloves. Underwear fabrics may be of either pure or weighted silk or of various types of rayon. Weighting can be immediately ascertained qualitatively by burning and quantitatively by chemical analysis. Since the fabrics are always weighted in the piece, complications due to mixtures of pure and weighted silk will not be encountered. Rayon can be placed in its correct class by the many chemical tests which are completely dealt with in current publications. In addition to this the nature of almost every fiber can readily be settled under the microscope. There is ample literature dealing with this also.

Finding the Denier

To find the denier of the yarns is not always an easy problem, mainly because one can rarely ravel or pick out a sample even as long as an inch, so that reeling and weighting is impossible. One method is to compare these short lengths under a lens with similar pieces of known denier. This would be more satisfactory if the pulling out of the short lengths did not seem to distort the twist and cause the sample to fluff up to a certain extent, making comparison unreliable. However, since the common range of sizes runs between 13/15 and 20/22 only (disregarding trams) fair results may be obtained since but four or five sizes are likely to be encountered. This method should be used cautiously with weighted yarns on account of the fulling action of the loading.

The writer has generally found it better to place the denier of the silk by microscopic examination. To do so one takes a piece of the yarn about ¼ inch long and, using a fine needle, picks it apart into the component fibers, which can then be counted on the microscope slide. The silk filament is a double one of about 2½ to 3 deniers and splits in half upon boiling off, so that, regarding each fiber as 1⅓ denier, the size can easily be computed. For instance, a 20/22 yarn should thus have 16 filaments.

It should be borne in mind when using this method that it is necessary to take the average finding from half a dozen or so samples selected at different points, since the denier of both the yarn and the component filaments has a tendency to vary considerably. It must also be remembered that more than one size of silk may be used in a tricot cloth. Careful picking apart of the sample will reveal this if it should occur. Tram silks, which are frequently used, are composed merely of two or three plies of the common sizes, and can generally be split into the separate plies. Failing this, the finding of deniers between 26 and 36 would indicate two-thread trams, and with higher than 36 one can expect three-threads. The rest is simple arithmetic. Two threads are the most common, but three-threads are often used in high grade cloths, especially milanese.

The denier of rayon is not always easy to determine in the above manner, since manufacturers are accustomed to vary the denier of the component filaments. However, rayon sizes seldom progress in jumps of less than 20 deniers, making the first method of comparison with known samples relatively simple. At the same time it is as well to count the filaments under a lens to ascertain whether or not the yarn is of the so-called super-filament type. A yarn having individual fibers of less than 2 deniers may be placed in this class.

Distribution of Yarn

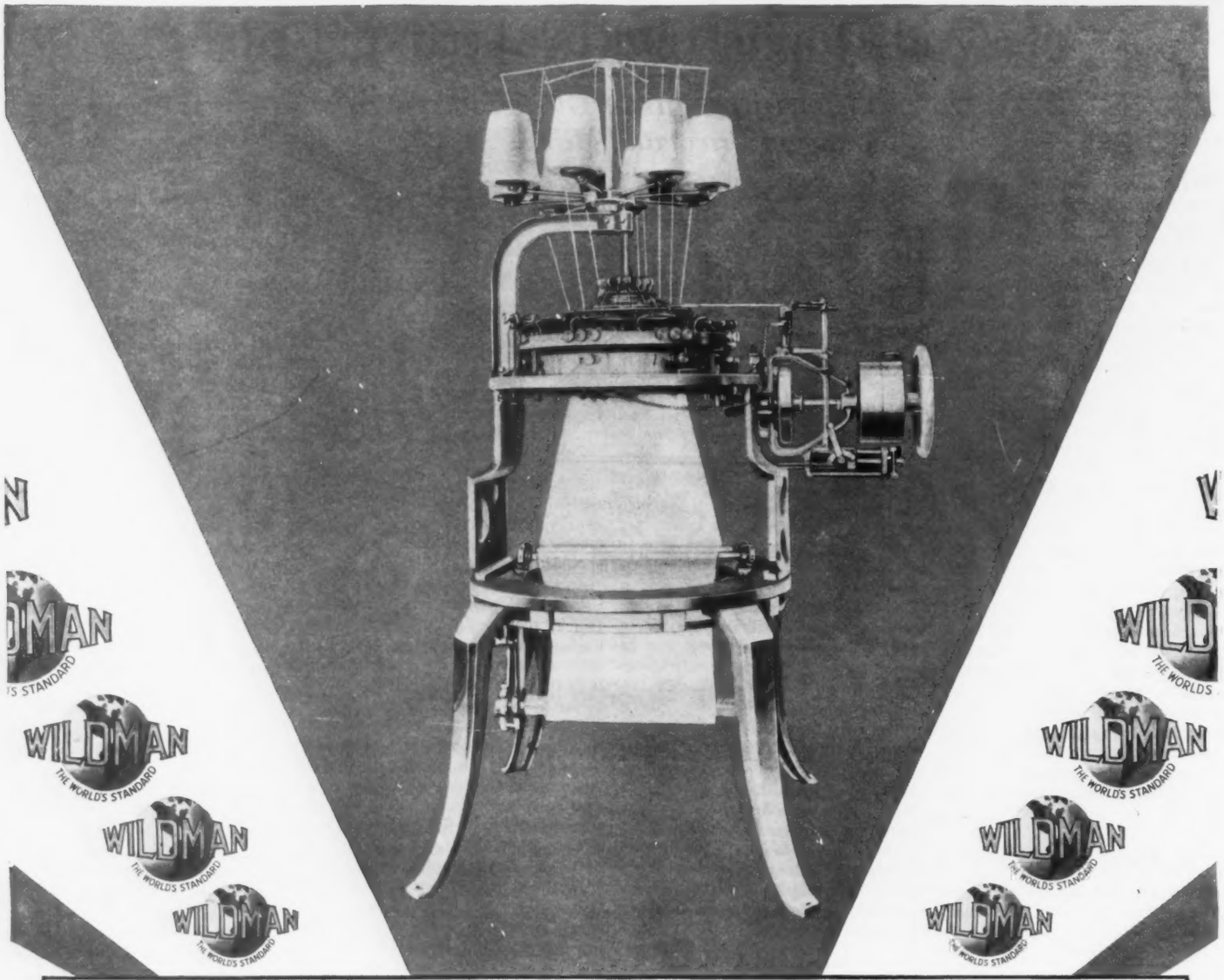
To ascertain the distribution of the yarn in the warps is simple. In plain tricot fabrics one beam always carries the one denier only. Any deviation from this will be immediately visible to the eye, by reason of striped or ribbed effects, and the analyst can govern his work accordingly. Milanese carries the one denier throughout the entire fabric, except in very infrequent cases, when any deviation from this would be indicated by diamond effects of any size. It remains then to find the type of stitch in order to know which yarn goes on which warp and in what proportion.

The commonest tricots are those in which the back bar, making the face of the fabric, crosses over two needles at each stitch, while the front bar crosses over three needles. This gives the back of the cloth a slight suggestion of a satiny appearance which is characteristic. The stitch necessitates warps in the ratio of 2 to 3; i. e., if the front beam carries 3,000 yds., the back will be 2,000. With care, samples of the backing and facing can be picked out separately and their respective deniers estimated. This is a very necessary procedure, since quite often there is a different denier on each warp. Occasionally underwear tricots are made with equal lengths of warp making the back and face of the cloth almost identical. These may be analyzed as above. More rarely still, tricots made on one bar are found. Their sleaziness and open appearance as well as a tendency to run will usually place them at once. There are several variations of stitch in these cloths, but they are of minor importance. They may be distinguished from circular goods by the presence in a runner of longitudinal instead of lateral threads.

Tricots with striped effects due to drop stitches are easily placed, merely by counting the stitches in the solid parts. They are made either by omitting certain threads in one beam of the warp, or by making a full warp and placing two threads into one guide at set intervals. These two methods may be differentiated under a lens. The fabrics are often used in underwear. The writer is not aware that three bar fabrics are used in silk for gloves, etc. They are used in some fancy cloths and in certain cotton glove fabrics.

Gauge of Machine

The next item, the gauge of the machine, refers to the number of needles in an inch. By far the most common is 28-gauge, but sometimes very fine cloth is made on a 32-gauge machine. Coarser gauges are not used for gloves or underwear to any extent. Usually any deviation from 28-gauge will be immediately noticed without any tests. However, if the sample is taken and stretched in width about as far as it will go without undue strain, the cloth will be brought to about the same condition as that in which it came from the machine. The wales can then be counted under a



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lens and should correspond to the needles in the same space.

Length of Rack

The phrase "length of rack" or "quality" refers to the number of stitches in a specified length of cloth as it comes from the machine, and corresponds to courses in circular knitting or picks in weaving. The rack is the arbitrary unit of 480 stitches and the rack length is the number of inches taken up by these stitches in the actual knitting—which is a vastly different thing from the stitches in the finished cloth. In tricot cloths it is customary to knit for gloves fairly tightly, usually about as close as the machine will readily take. Of course, a heavier yarn will require a little more space than a lighter so that the length of rack will be greater. A plain tricot knitted from 20/22 single yarn would probably be from 3 to 3½ inches to the rack, while a similar cloth from 13/15 boiled-off tram would be 4 inches or more. The milanese cloths are usually knitted at the length most conducive to satisfactory operating of the machine —commonly around 4 inches.

Tricots are varied considerably and underwear cloths are often made 6 inches to the rack or even more. In actual fact this matter of rack length is of comparatively minor importance, although many operators take great stock in it. To instance this: the writer found that a 20/22 tricot knitted 3½ inches to the rack (137 stitches per inch) weighed barely 4% more when finished than the same cloth knitted 6 inches to the rack (80 stitches per inch) and finished in identically the same way. This is due to the equalizing effect of the subsequent stretching during tentering. It should be mentioned, though, that as the yarn becomes heavier this neutralizing effect is considerably less apparent, but in no case, except a purely theoretical one, is the finished weight directly proportional to the rack length. These matters are discussed in greater detail in previous articles by the writer in TEXTILE WORLD of Apr. 25, 1925, and Aug. 22, 1925.

Width Finished and Knitted

The item of the relation of finished width to knitted width is a fairly important one, as it covers the amount of stretch in a fabric, and, to a certain extent, its weight also. In tricot fabrics for gloves, the cloth is generally finished one-half its knitted width, while for underwear the proportion is somewhat less, or about 2/3. In milanese the glove ratio is about 4/7 and the underwear about 9/16. None of these is necessarily exact.

It is difficult to find this finishing ratio without knowing the gauge, and vice versa. For instance, knowing the gauge to be 28 and finding the wales per inch in the cloth to count 55 to 57, we are safe in assuming that the cloth has been finished one-half its knitted width. Conversely if we take a swatch of cloth and measure off an exact distance, say 3 inches, and stretch it between finger and thumb of each hand until it feels to have reached its elastic limit without undue strain or distortion, we can measure again the marked section. If it is now approximately 6 inches, it is reasonably safe to assume that the finishing ratio was one-half. Other ratios would naturally be in direct proportion.

While counting the needles, the stitches can also be recorded as having some bearing on the rack length, but it is best not to pin much faith on this finding unless one has at one's disposal a complete table of such numbers compiled from known and standard samples. As an example, take the two fabrics mentioned above. The first one, knitted on 3½-inch quality, showed 56 needles and 51 stitches to the inch, while the 6-inch quality showed 55 needles and 48 stitches, which is just about enough difference to justify the 4% variation in weight and obviously too slender to give any exact opinion when one bears in mind that the increase in rack length is over 70%.

Weight of Unit Area

While considerable weight is attached to rack length in knitting, in analysis it merits slight attention. A far more informative factor is that of the weight of a definite area of cloth, to which the knitter all too frequently pays little attention. If possible it is better to weigh a large swatch—say a square yard. Lacking this, the well-known method of cutting small circular swatches by means of a steel die and weighing on a chemical balance is quite satisfactory. Knowing the exact diameter of the die, there is no difficulty in deriving a factor that will give the weight of a square yard, which is the general glove-silk unit in preference to the vague linear yard. The difficulty lies in the necessity of having a table of known weights compiled from actual samples. This can be prepared with a little patience, and, while not providing absolute information, will give a basis of comparison which frequently will help to settle doubts as to denier, quality, or finishing ratio. An article dealing with approximate weights of tricot and milanese cloths appeared in the TEXTILE WORLD of Sept. 17, 1927.

As mentioned at the outset, successful analysis will depend upon a reasonable acquaintance with the fabrics plus the intelligent balancing and correlating of such evidence as the few tests may show. No attempt has been made to go into the innumerable fancy fabrics of silk, rayon, and cotton that are made on the machines in question. Generally speaking, the tests mentioned will put one on the right track for these, but some knowledge of the main types is indispensable.

Testing Knit-Goods Accessories

Machine Invented for Examining Ribbons, Tapes, and Bands

By William Davis

THE maker of knitted articles usually has to purchase considerable quantities of narrow ribbon-like fabrics and tapes for use on his garments in the trimming and mounting operations for making-up ready to wear. These items particularly concern the underwear and outerwear manufacturer. The list of different ribbons, tapes, and bands required to conduct his branch of business is a lengthy one.

These items are naturally submitted from various sources, and it is often required to ascertain which of these offerings is the best value for the money expended. It is also desirable from time to time to test tapes and bands selected in order to ascertain whether they are up to the their former standards of strength and quality. In most large businesses, testing is regularly done on all yarns for count, twist, and so forth, and there is great reason why this scrutiny should be extended to the smallwear.

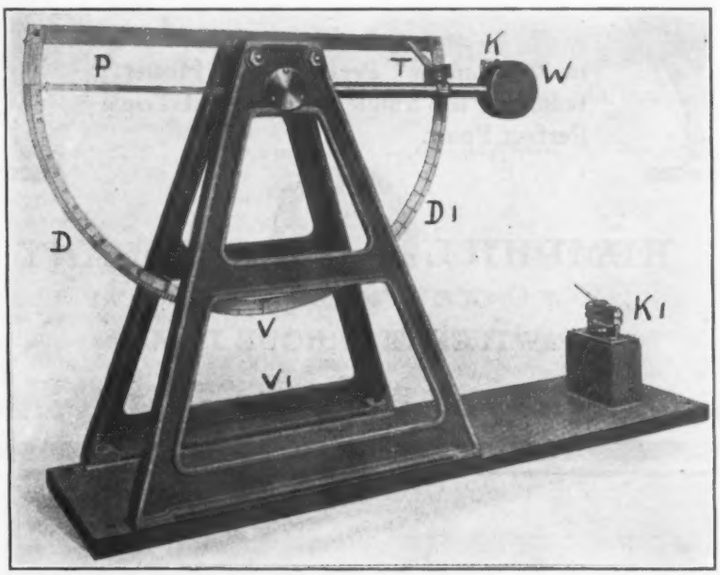


Fig. 1. Ballistic Testing Machine

Various Types

These straps and bands are of various types and constructed in various systems:

(1) They may be of the ordinary woven-ribbon variety, where there are a warp and filling and the fabrics vary from one quarter to over an inch in width.

(2) Tapes and braids are often worked on the braiding machine where the threads are platted into each other with an intimacy that affords more strength than is possessed by the woven ribbon. These braids are very useful in a garment as they afford greater support to the edges and other parts where extra strength and firmness are essential.

(3) Ordinary cotton web is cut into strips to be used for supports on the fronts of garments. These strips are also placed at special points of a garment where they can take the strain of the weight and so prevent sagging of the article.

(4) Tubular fabrics are made for this purpose on narrow-width knitting machines where there are only some 15 to 30 needles in the circumference. These pieces are pressed flat and used as edgings on knitted goods, generally underwear or intermediates.

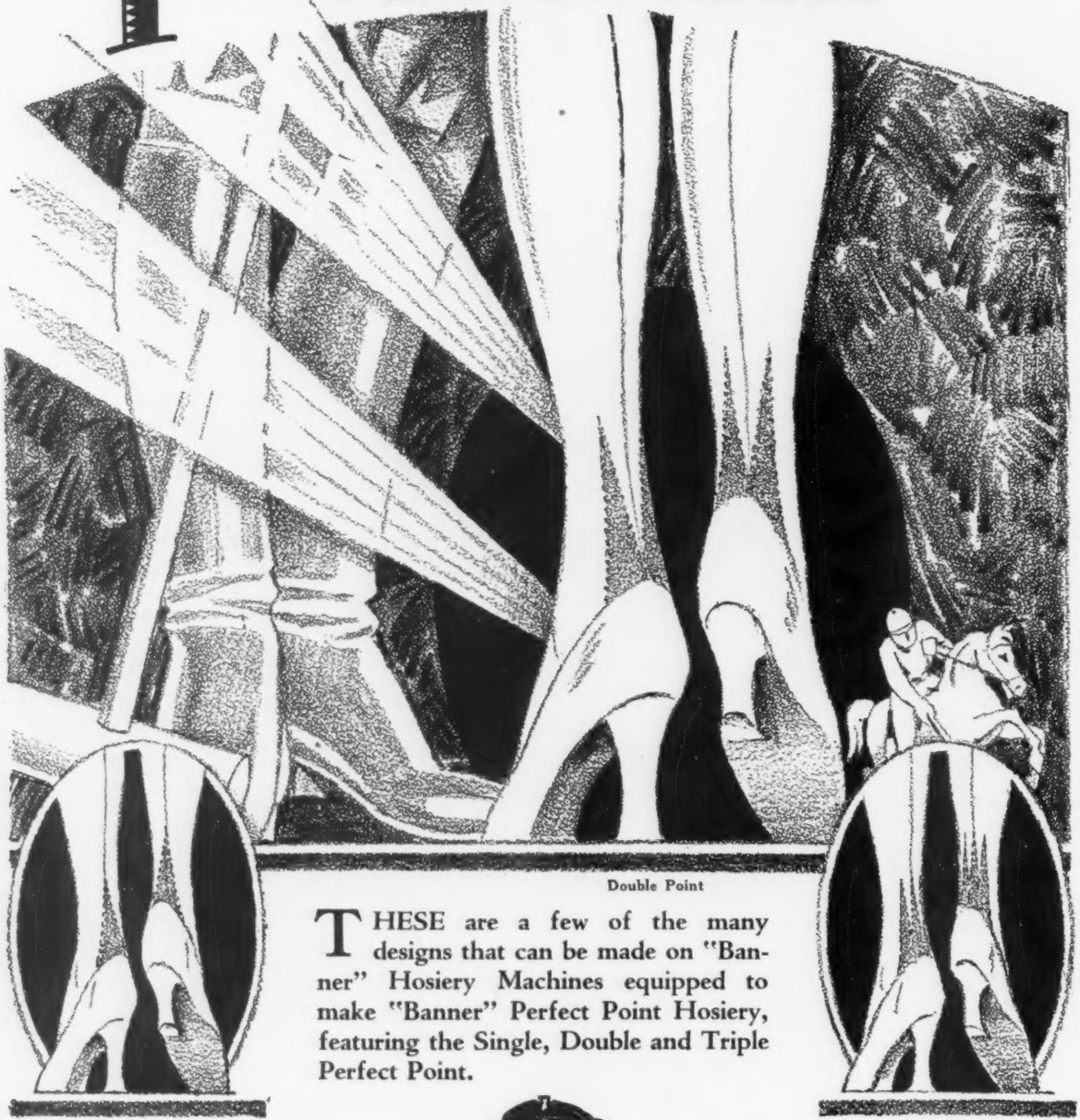
(5) Strapping is often made on knitting machines which are provided with arrangements for producing knitted strings in single thread using the ordinary knitting loop as a long chain. These are afterwards worked together into ornamental form, to be attached to the garment edges as required.

As a general rule these portions of the stock of the knitting manufacturer are taken untested by any instrument. Attention should be called, however, to one which has been designed by the Cotton Research Association of Great Britain. A view of the machine, known as the ballistic testing machine, is shown at Fig. 1, where the main parts are designated as follows: P is the pointer which shows the breaking strain of the fabric in inch-pounds on the scale marked D. This scale is graduated from zero at the position shown in the illustration to 150 inch-pounds at V.

The breaking force is the weight given at W attached to a lever which swings from the center of the machine. The weight W is kept at the high or starting position by the catch T, and the clamp at K is the point where the tape is attached. To insert the sample, the weight is lowered to the vertical position at V1 and the sample is extended from V1 to K1. Before the tape is secured by the clamps at K1 it is advisable to hang a weight of one pound or so at the end of the tape to ensure that each test is made under identical starting conditions of tension.

When the length of tape or ribbon has been fastened, the weight lever is again raised to the position shown horizontally in the figure and the pointer P is drawn down to the verti-

PERFECT
POINTED HEELS



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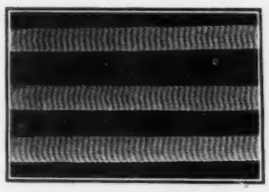
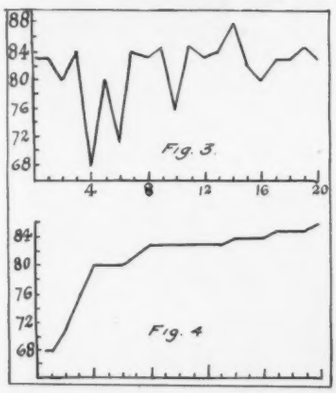


Fig. 2. Rayon Braid



Figs. 3 and 4. Results of Tests on Braid Shown in Fig. 2

cal position at V. To make the test, the catch T is released and the weight lever swings down past the middle point V, and, proceeding up the opposite side, breaks the sample. The force consumed in doing this work is registered in inch-pounds on the dial, the pointer P stopping at the breaking point to show the result. Unlike most testing machines, the higher up the test moves on the left indicator, the lower is the test reading, and the weaker the material shows itself to be.

Results of Tests

This type of machine is so new to the knitting industry and at the same time is calculated to be so useful that the writer will cite several examples of its results. Fig. 2 shows a braid made of rayon which is extensively used for trimming on knitted articles. The width is one-fifth of an inch. The results of 20 tests in inch-pounds

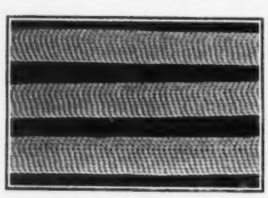
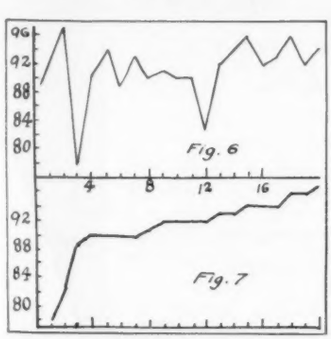


Fig. 5. Wider Rayon Braid



Figs. 6 and 7. Results of Tests on Braid Shown in Fig. 5

on the ballistic testing machine are given herewith in the order in which they were taken on continuous lengths of the braid: 83, 80, 84, 68, 80, 71, 84, 83, 85, 76, 85, 83, 84, 88, 82, 80, 83, 83, 85, 83. These figures are drawn out in graphical form in Fig. 3, where the number of tests is shown along the foot of the graph; and the various test numbers, up the side. Points 68 and 71 are the lowest recorded, with 88 inch-pounds as the highest. These figures are shown in a frequency line in Fig. 4, where the form of the graph indicates the number of tests at the same result. Thus three tests occur at 80, five tests occur at 83, and so on.

Fig. 5 is a second example of a braid largely used in knitted goods. It has a width of three-tenths of an inch and is worked in the same material in strong braiding texture. This increased strength is shown by

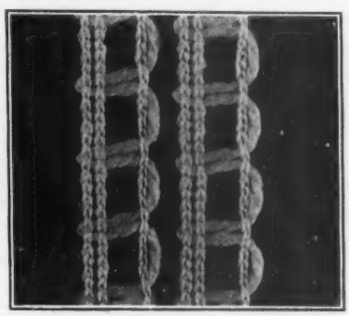
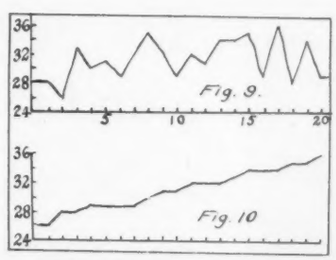


Fig. 8. Cotton Lace Tape

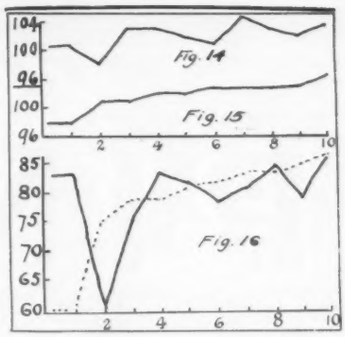


Figs. 9 and 10. Results of Tests on Tape Shown in Fig. 8

the results in inch-pounds of 20 tests made on it under exactly the same conditions: 92, 97, 78, 90, 94, 89, 93, 90, 91, 90, 90, 83, 92, 94, 96, 92, 93, 96, 92, 94. These figures show 78 to be the lowest test and 97 the highest. The series is set down in graph form in Fig. 6. In Fig. 7 all the numbers which register the same test are taken together and their respective frequencies are shown.

Suggestions for Operating

In working the tests, practice brings greater facility, and one operator can produce one test in just under a minute. Therefore, the whole series of 20 tests shown above can be made in a quarter of an hour. For practical every-day testing, ten tests should be ample for most purposes, and these can be taken in a period which absorbs very little of the working time. In practice, it is found advisable to steady the weight W by a block of wood or similar contrivance when it is down at VI having the test piece attached. The machine can be improved by attaching a weight or lever above the clamp at KI so that the test pieces can be drawn to equal tension as they are being inserted. This is done on the dead-weight cloth-testing machine; and, if it is adapted to this model, it will ensure more rapid work, as the time required to attach a separate weight on each test piece will be saved.



Figs. 14, 15, and 16. Results of Tests on Viscose and Acetate Yarns

Figs. 8 and 11 show lace tapes much used in knitted goods. Fig. 8 is constructed entirely of cotton for a cheap-grade of goods. Fig. 11 is made of rayon. The results of a series of 20 tests on the cotton tape of Fig. 8 are as follows: 28, 26, 33, 30, 31, 29, 32, 35, 32, 28, 32, 31, 34, 34, 35, 29, 36, 28, 34, 29. These are set out as before in graphs 9 and 10, and the tests are seen to fluctuate between 26 and 36. The frequencies are shown in the line of Fig. 10.

Another series similarly taken on the tape of Fig. 11 shows the following range of values: 40, 20, 37, 42, 28,

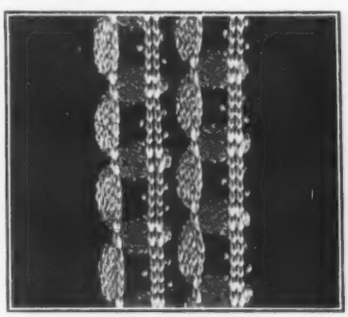
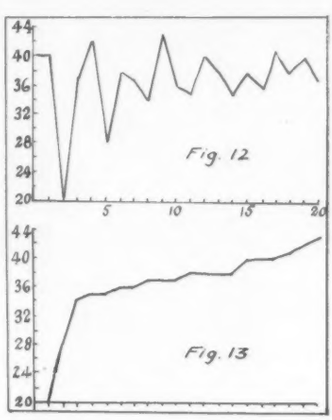


Fig. 11. Rayon Lace Tape

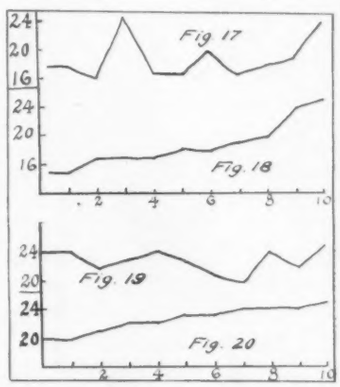


Figs. 12 and 13. Results of Tests on Tape Shown in Fig. 11

38, 37, 34, 43, 36, 35, 40, 38, 35, 38, 36, 41, 38, 40, 37. The results are again set out in Fig. 12, where a bad break is shown at 20 for the lowest, with 43 for the highest point—a large limit of variation. The frequency line for the same series of tests is given at Fig. 13.

Yarn Tests

The knit-goods manufacturers have not much use for the lea test of dead-weight pull, and many have adopted the single-thread method, which shows the breaking strain in ounces. This method also gives some information that is very important, the elongation which the yarn undergoes before breaking takes place. With the new autographic machines, these results can also be drawn on squared paper, and the curves filed as permanent records. This enables the tests to be made by relatively inexperienced workers, who are not required to



Figs. 17, 18, 19, and 20. Results of Tests on the Cotton and Worsted Yarns

tabulate results test by test. The automatic graph makes a picture of the behavior of the yarn as the strain is being applied.

In many cases, however, if a manufacturer is using the ballistic machine, he may wish to extend its functions to cover his yarns as well. Particularly in cotton this can be done with good results, but the elongation is not given. This involves the recording in a suitable number of strands. The distance from VI to KI in Fig. 1 is arranged so that a lea can be attached direct from the wrap reel. The cotton measure of this is for a circumference of 1½ yards, and this halved gives 27 inches, which is the distance from VI to KI. For comparative purposes, the number of turns of the reel for a test length has to be fixed according to the kind of yarn used, as these must come within the capacity of the machine. In the examples given herewith, there are 10 turns on the reel, which, when laid together, give 20 strands in the test piece. Once the number of strands has been fixed, it is advisable to adhere to the number throughout all tests, as it then becomes possible to think in terms of the new unit and fix the efficiency limit for each count in inch-pounds.

For comparison, a series of four yarns were taken all of the same count; namely, 300 deniers viscose yarn, 300 deniers acetate rayon yarn,

(*Continued on page 51*)

BRINTON

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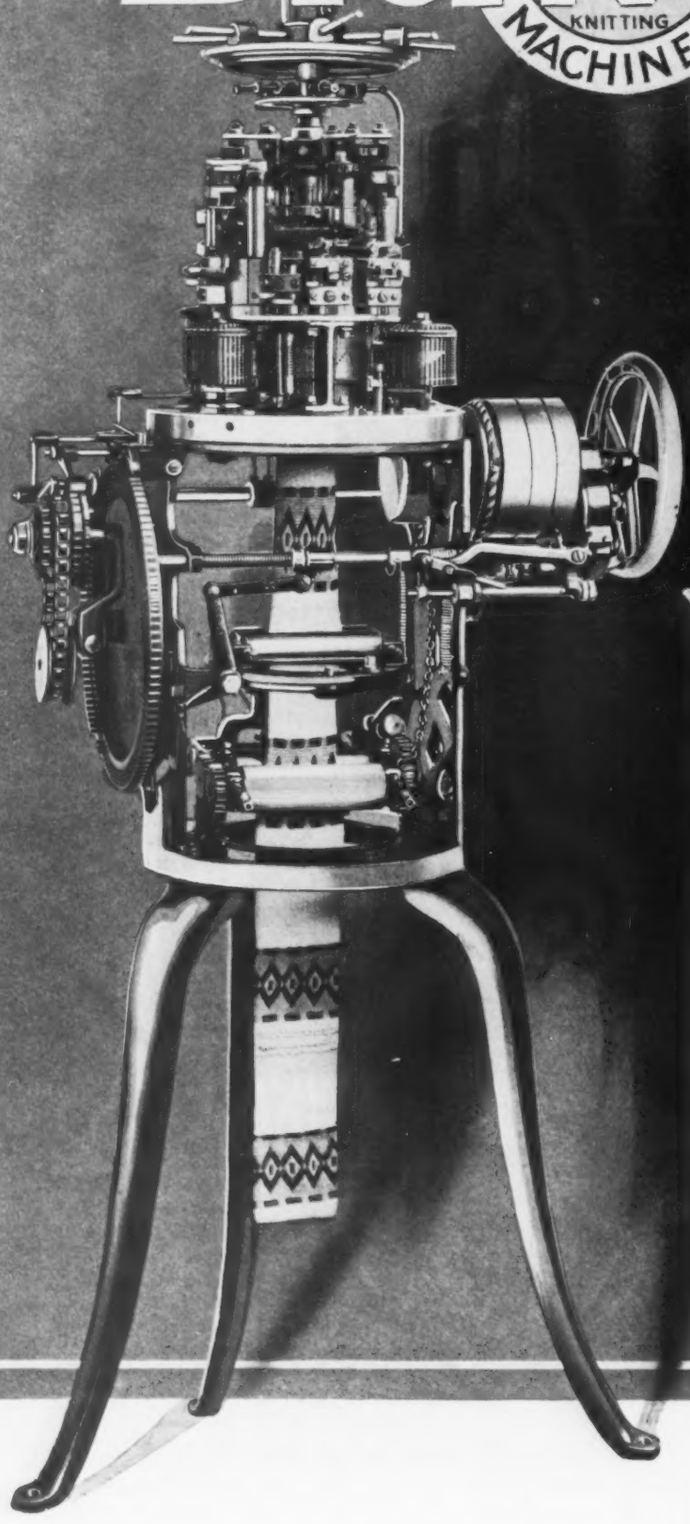

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Knitted Jacquard Effects

Made on Fine-Gauged Fabric—Other Developments

A comprehensive review of the new developments in knitting and hosiery machines abroad, made by H. W. Anderson, president of the Fidelity Machine Co., Philadelphia, includes a number of interesting particulars. Among the new developments are a German full-fashioned machine operating by radically new needle manipulations for jacquard effects on women's fine hosiery; a high-speed circular knitting machine for producing both fine- and coarse-gauged milanese fabric, at the rate of six inches per minute, or more; a men's fully automatic half-hose machine with wrap-around principle, having a unique shogging arrangement; and a process developed in Czechoslovakia for giving knitted jacquard effects on fine-gauged knitted fabric.

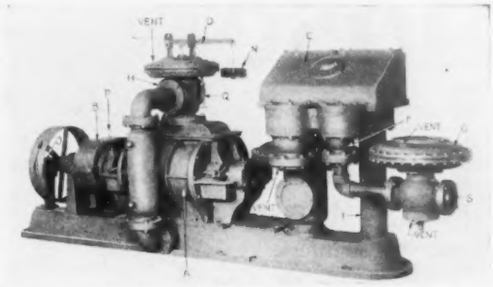
The American rights for the process last mentioned have been taken over by the Fidelity Machine Co., and undoubtedly will prove interesting, says Mr. Anderson, to a limited number of manufacturers of women's hosiery of unquestionable style prestige. The process is to be known in the American market as the "Fidogia."

A brief summary of the entire process includes the following: Improved accuracy and registering by printing is claimed, so that when a knitted garment, or a pair of stockings, is printed, the impression is so accurate that both sides match up properly. A neutral chemical has been developed which is printed or painted on any type of fine-gauged knitted fabric consisting of either two yarns of different material twisted together, or one yarn plated upon another of a different material. Another chemical has been developed which dissolves one of the yarns wherever the printed pattern does not occur, so that the design, of any complexity, is obtained and is actually a design knitted into the base fabric. The printing of the neutral agent upon the knitted fabric is not only claimed to improve the accuracy of registering, but also to improve the speed of production. The final effect is an original raised and knitted jacquard design. The American patent, which is pending, embraces the entire process as applied to knitted fabrics.

Improved Gas Equipment

Mixes Gas with Air for Singeing, Calendering, Etc.

An improved system for preparing city gas for singeing, calendering, heating, etc., has been placed on the market by The C. M. Kemp Mfg. Co., 405 E. Oliver St., Baltimore, Md. The machine mixes the gas with the required quantity of air for efficient combustion.



Improved Machine for Efficiently Mixing City Gas and Air

The improved system supersedes the former "Kemp system," and is claimed to be superior to it mechanically and to function with greater accuracy. It is announced that the old system can be converted to the new type at reasonable cost. Over the entire range of the machine's capacity, constant flame characteristics can be maintained, it is stated; and whether the machine be operating at one one-hundredths of its full capacity or at full load, it is claimed to produce the same desired results. The new machine requires less space than the old and is lower in price.

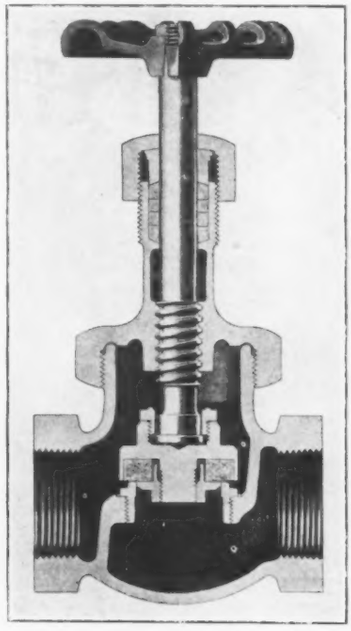
Bronze Steam Valves

For 250 Lbs. Pressure—Renewable Resilient Disc

Jenkins Bros., valve manufacturers, announce a new line of bronze valves with renewable resilient disc for 250 lbs. steam working pressures. The disc, being more resilient than the metal, readily conforms to the seat, and insures a tight valve without regrinding.

The line comprises globe, angle, cross and horizontal and angle check patterns furnished screwed or flanged in sizes ranging from ¼ in. to 2 in. The globe, angle, and cross patterns are furnished with renewable seat rings. The bonnet screws over the body, a construction which adds strength. The bonnet seat joint is rounded, a feature which also provides strength and at the same time allows easy removal of the bonnet.

Other features of the globe, angle, and cross patterns include: non-heat hand wheel of malleable iron; bronze gland which aids in preventing leakage around the spindle; deep stuffing box generously packed with asbestos ring packing; and manganese bronze spindle with large, powerful threads, all of which are in contact with bonnet threads when the valve is closed.



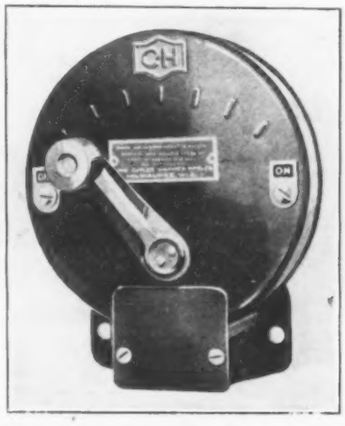
Steam Valve with Renewable Resilient Disc

Regulating Rheostat

For Fractional Horsepower Motors, Lighting, Etc.

Neat appearance, low price, and simplicity of installation are features of a new direct-current regulating rheostat announced by The Cutler-Hammer Mfg. Co., Milwaukee, Wis. It can be used to control the speed of fractional horsepower motors driving small blowers, fans, buffers, bookkeeping machines, and similar apparatus; it can be used as a dimmer on lighting circuits; or it can be used as an electric heater regulator. The device is of the circular plate type, completely enclosed. It is small in size to permit mounting directly on machines or in any out-of-the-way place. The standard rheostat is furnished for conduit wiring; but, if open wiring is to be used, a porcelain bushing is quickly added.

The mechanism consists essentially of a cement imbedded resistance unit, with brass contact buttons protruding through the cement, and a contact arm which moves over the buttons, varying the resistance. A small, neat-appearing enclosing case with an outside operating lever protects the unit and prevents accidental contact with live parts.



Rheostat for Controlling Speed of Small Motors, Dimming Lights, etc.

Automatic Circuit Breaker

For 125-Volt A.C. or D.C.—6, 10, and 15 Amp. Ratings

An automatic circuit breaker, designed for use on 125-volt alternating or direct current, with ratings of 6, 10, and 15 amperes, is now being manufactured by the Merchandise Department of the General Electric Co., at Bridgeport, Conn.

Automatic Circuit Breaker for 125-Volt A.C. or D.C. Circuits

This device was developed to control and protect branch lighting circuits, as well as small motor-driven apparatus, and differs from similar breakers in that it combines the positive action of the electromagnet with the time lag of the thermo-metallic element, but does not require the thermo element to do any mechanical work. The breaker operates single pole with a double break.

The opening of the silver contact points due to heating of the thermal element on overload causes all of the current to pass through the magnet, and trips the breaker instantly. The time necessary to heat the element under the various degrees of overload constitutes the lag which is comparable to the action of a fuse, permitting the momentary inrush of cur-

True Ribbed Multi-Design Hose

COMPARE two retail counters. . . . One shows the old, dull lifeless type of patterns. The other is alive with new Multi-Design colors and patterns. . . . Which will sell the goods? The sales records achieved by the hosiery manufacturers and retailers who feature Multi-Design effects give the answer!

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See also CONSOLIDATED TEXTILE CATALOG

New Machinery and Processes—Continued

rent but protecting against a continued overload.

As an appliance switch, it can be mounted in any position, has no exposed metal, functions equally well on alternating or direct current, and will withstand severe vibration without opening.

The sliding contacts tend to maintain clean surfaces. The floating contact spreader assures even, level bearing and equal pressure. The toggle handle movement is easy to operate, and always indicates by its position whether the circuit is open or closed.

The catalog numbers are GE-2669, GE-2668 and GE-2667 for the 6, 10, and 15 amperes, respectively.

Children's Sock Machine

Allows Hosiery to Be Made without Transfer Knitters

It has long been possible to produce men's socks with the cuffs made on the same machine automatically, and now the small diameters necessary for producing children's hosiery have been made available by Wm. Spiers, Ltd., English machine builders. Their "Autoswift" machines have been developed with this special purpose in view. They eliminate the necessity for transfer knitters.

Some European manufacturers have already adopted the new equipment, especially in Germany, where a number of mills have made installations. A recent visitor to mills in Leicester, England, was shown whole rooms full of these machines, some making the ever popular infants socks, with several-colored striped cuffs. The noticeable feature about these plants was the small number of hands employed, each worker tending six or eight machines. Inquiry revealed that both the waste and the cost of production were low and the output of one machine, 160 needles, 3-inch diameter, was over seven doz. per day of mercerized and rayon-plated socks.

An interesting feature of the machine is that a stitch is never dropped at the end of the cuff. This is because the stitch is always on the same needle, whether the fabric is ribbed or plain. Either ribbed or plain fabric can be made at will, which enables the production of broad panel ribs, or the regular 1/1 ribbed hose, with either a plain foot or ribbed instep. The principle employed is the two-ended needle, which knits the rib stitch at one end, and the plain stitch at the other end, and when the change is made from rib to plain, the needle is passed from one jack to another, two cylinders being employed, and mounted one above the other.

The striping mechanism is ingenious. The yarn next to be used is placed into the feeding position, with the clamped end below the sinker line, and in the path of a specially shaped sinker, which takes possession of the yarn, and carries it into the needles. The striping yarn can thus be positioned even an inch or two ahead, and still enter on the same needle every time, and no loose threads show on the inside of the work.

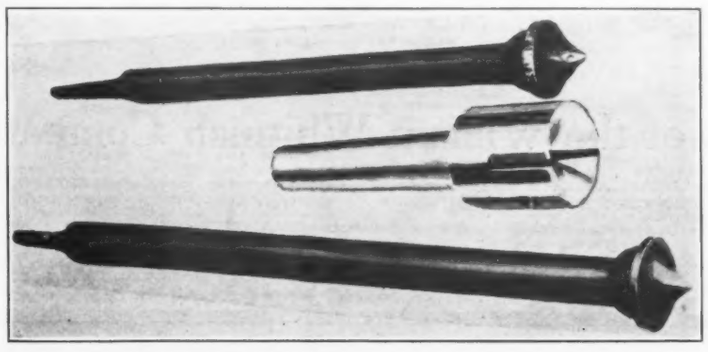
The principal improvement, and one which has enabled finer gauges to be made successfully, is the use of movable stitch-cams to regulate the various tensions for the welt, cuff, leg, and heel. This enables a fixed position to be used for the sinker height. Previously, the sinkers were raised or lowered for this purpose, which on this type of machine, caused a varying strain on the rib loops, owing to the manner in which the rib latches must pass over the feeder. The sinkers are now fixed at the most favorable height, and the strains eliminated.

The new machines also have a fixed dividing-cam, working in conjunction with a much reduced transfer-cam action, which makes for faster and more reliable operation. The movable dividing-cam and the receiving-cams have been eliminated completely from the pattern-changing mechanism. The action of the needle-lowering picker has been reduced by half, and the latches of the out-of-action needles completely covered by the opposing sliders. This arrangement gives greater speed, and eliminates dropped stitches in the gore. The rib latch-lifter, which previously required withdrawing while a heel was made, is now a fixture, and is an integral part of the feeder. Standard three-pulley drive is used, instead of sliding dogs and clutches. The drive shaft, cylinders, and even the work-drum revolve on ball bearings.

Device Repoints Skewers

Steel Shank with Two High-Speed Steel Knives

A cutter head for repointing skewers has been placed on the market by the Superior Clamp Co., 1055 West Van Buren St., Chicago, Ill. It consists of a steel shank equipped with two high-speed steel knives. The knives are ground to cut off the worn points. The pointer may be used in a wood-turning lathe, or the maker will furnish a suitable motor and steady rest slide to center the skewer while it is being cut. In the accompanying photograph are shown at the top a worn skewer; in the center, the cutter head or skewer pointer; and, at the bottom, a repointed skewer.



Cutter Head for Repointing Worn Skewers

Graphite Seal

Seals Screw Thread, Flange, and Gasket Joints

The Joseph Dixon Crucible Co., Jersey City, N. J., announce a new addition to their line of graphite products. The new product is "Graphite Seal"—a graphite paste for sealing

Packages of Graphite Seal

screw thread, flange, and gasket joints of pipe lines carrying hot or cold oils, gasoline, etc. It is insoluble in oils and gasoline.

Dixon's graphite seal expands when subjected to heat and makes leak-proof joints that hold tight under all conditions of service. Yet these joints may be opened with ease at any time without delay or damage to tools or fittings. It is also recommended as excellent for use on hand hole and manhole plates, etc., or wherever there is a flange and gasket connection. Numerous other uses will be suggested. For automobiles, it is recommended in place of shellac for all gaskets and also for making joints in oil and gas lines.

Bleaching Process

One Step Bleaches and Fixes Color in Iron Kier

Edgecombe M. Jones, 1420 Burrstone Rd., Utica, N. Y., has developed a method claimed to cleanse, scour, bleach, and color-fix cotton raw stock, yarn, warps, piece goods, linen, wool, silk, and other materials in a single process. Specially selected reagents capable of bleaching and color-setting, but incapable of forming iron rust with the kier, accomplish this result. The reaction is a combined reducing and oxidizing one, which incidentally forms a coating for preventing the formation of rust in an iron kier. The process is claimed to be particularly useful for treating such woven fabrics as Turkish towels, which have white areas to be bleached and colored areas or bands to be rendered brilliant, distinct, and in clear contrast to the white area. The reagents used are familiar to textile men and are not expensive.

RECENT TEXTILE PATENTS

CYLINDER for Knowles head. 1,683,220. W. M. Wattie, Worcester, Mass. Assigned to Crompton & Knowles Loom Works, Worcester, Mass.

KNITTING frame, Straight. 1,682,965. W. Heinitz, Chemnitz, Germany.

KNITTING machine. 1,683,586. J. F. Maloney, Woonsocket, R. I. Mary M. Maloney, Administratrix.

KNITTING machine, Circular. 1,683,203. H. McAdams, Philadelphia, Pa. Assigned one-half to Jesse W. Starr, 3rd, Atlantic City, N. J.

KNITTING machines, Striping attachment for. 1,683,540. A. Gagne, Central Falls, R. I. Assigned to Hemphill Co., Providence, R. I.

LOCK for drop-box looms, Automatic box. 1,683,543. J. D. Groves, Milltown, Me. Assigned one-third to Lemual R. Groves, Millinocket, Me.

LOOM, Circular. 1,683,385. O. A. Frederickson, Wethersfield, Conn. Assigned to The Wiremold Co., Hartford, Conn.

LOOM feeler mechanism. 1,683,369. P. F. O'Brien, Franklin, Mass.

LOOM for manufacturing nonraveling fabrics. 1,683,052. F. Phily, Pau, France.

LOOM reed, Adjustable. 1,683,187. E. R. Holmes, Worcester, Mass., Assigned to Crompton & Knowles Loom Works, Worcester, Mass.

LOOMS, Dobby for. 1,682,791. J. T. Malloy, Oakland, R. I. Assigned to Draper Corp, Hopedale, Mass.

LOOMS, Hook mounting for pile-wire-controlling mechanism for. 1,683,495. W. E. Smith, Milltown, N. J. Assigned to Gulbenkian Seamless Rug Co., New Brunswick, N. J.

LOOMS, Lay motion for. 1,683,324. W. H. Baker, Boston, Mass.

LOOMS, Reed adjustment for. 1,683,216. W. H. Wakefield, Worcester, Mass. Assigned to Crompton & Knowles Loom Works, Worcester, Mass.

LOOMS, Spool for Axminster. 1,683,224. W. H. Wilson, Burlington, Vt. Assigned to Vermont Spool & Bobbin Co., Burlington, Vt.

MACHINE for spinning and winding filaments. 1,682,763. K. Meyer-Gaus, Barmen, Germany. Assigned to American Bemberg Corp., New York.

NEEDLE for repairing runs in knitted fabrics. 1,682,985. H. T. Rollins, Des Moines, Iowa.

SPINNING artificial silk, Apparatus for. 1,682,797. G. Otto, A. Hartmann, and G. Bauriedel, Barmen, Germany. Assigned to American Bemberg Corp., Delaware.

SPINNING machine. 1,683,436. R. Barbour, Paterson, N. J. Assigned to Barbour Flax Spinning Co., Paterson, N. J.

THREAD and making same, Artificial. 1,683,199. L. Lilienfeld, Vienna, Austria.

WARPER. 1,683,367. J. T. Melchor, Mooresville, N. C. Assigned to Saco-Lowell Shops, Boston, Mass.

William Whitman Company, Inc.

Sole Selling Agents for

Arlington Mills	Lawrence, Mass.
Monomac Spinning Co	Lawrence, Mass.
Acadia Mills	Lawrence, Mass.
Nonquitt Spinning Co	New Bedford, Mass.
Nashawena Mills	New Bedford, Mass.
Calhoun Mills	Calhoun Falls, S. C.
Mary Louise Mills	Cowpens, S. C.
Tallapoosa Mills	Tallapoosa, Ga.

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All Twists, Counts and Putup

Knitting yarns, single and ply
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Tire yarns
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Electrical yarns
Glove yarns
Webbing yarns
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Fine Count Cop yarns
Carpet yarns
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SKILL WINS FAVOR
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Men's Wear

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Mixtures
Vigoureux
Cheviots
Tropical Suitings
Gabardines
Coverts
Shepherd Checks
Whipcords
Wide Wales

Lustre Linings
Dress Goods

Serges
Flannels
Kashmir; Crepe
Shepherd Checks
Coverts
Broadcloths
Ottorep; Poplins
Creams; Twill cords
Suitings; Coatings

COMMISSION WORK

Wool Combing by
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Naphtha Solvent Process

NASHAWENA MILLS NEW BEDFORD MASS.

COTTON CLOTH AND COTTON SILK AND RAYON MIXTURES
All-Combed Goods in Gray for Converters

Voiles; Crepes
Poplins and Broadcloths
Cotton Gabardines
Venetians and Sateens
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Plain Canton and Tussah Filled Fabrics
Marquisettes
Cotton-back Satins
Jacquard weaves; Specialties

Staple Southern Print Cloths

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for
Men's Wear
Dress Goods and Silk Trade
for
Hosiery
Underwear and Rubber Trades
Yarns manufactured according to Government specifications
Worsted and Worsted Merino twisted with
Cotton, Mercerized or Rayon
Slub dyed Worsted and Merino Yarns

Catalogue Mailed on Application

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QUESTIONS AND ANSWERS

Service on Mill Problems and Correspondence With Readers

Pressure on Top Rolls

Technical Editor:

I have been a reader of your valued paper for several years, and have a question I would like to ask you. I have been overhauling some Saco-Lowell spinning frames, cap, some cone rovers, cone reducers, finishers, drawing frames, and gill boxes. I notice that everyone seems to have a different idea as to how much tension should be applied to the leather top front rolls and also the back top rolls. There seems to be no definite standard to go by, and generally the section hands tighten them so that the frame runs hard. It seems to me that there must be some standard or gauge or way of determining when the correct tension has been applied, and I hope you can give me the information. Too much tension means wasted horsepower besides unnecessary wear on bearings, etc. I believe that too much tension on these top front rolls is being used and would like to know a way of determining when the correct tension has been reached. (6573)

In worsted drawing the length of staple varies from 4½ to 15 ins. or more, according to quality. In addition the ends vary in size, suitable ranges being for 40 yd. lengths as follows: 384 to 3 drams, more or less, for fine wools; 640 to 6 drams, more or less, for coarse wools. Commencing at the two-spindle gill box all ends contain twist.

The percentage of oil used, including that added in the drawing, may vary between 3 and 5%, according to the quality of the wool. The tops used are not always the same age. Some lots may be three months old, others may be three days old. The twist inserted in the ends will vary according to volume (size), quality, length of staple, percentage of short fiber, percentage of oil, and whether cone or open drawn. Cone frames permit 10 to 15% less twist.

We have mentioned these factors in order that you may understand how difficult it is to determine suitable standards when so many variables exist. The factors given are common to all mills, but in each mill they make their own decisions regarding the procedure in the drawing to obtain good results. Each man will have his own opinions, determined largely by previous experience and training, regarding speeds, ratch and carrier settings, twist in the ends, and draft. Many times an overseer will use more twist than his judgment considers advisable due to factors beyond his control, such as the sets being unbalanced and requiring higher speeds on some boxes, or having bobbins too large on one or more boxes, more twist enabling excess drag to be safely met. An even end must be produced and each man must decide what roll pressures are necessary to draft the stock efficiently. The pressure must be sufficient at all times. The twist will vary slightly. The percentage of long fibers will not always be constant in the drafting zone. The top front roll covers do not all have the same resiliency, especially leather. The grooves in fluted rolls may be filled with grease and dirt. The flutes may be badly worn on some boxes. The friction developed at the tension bearings varies for different rolls.

The common method of developing pressure at front and back roll nips is to use springs. Compression of the spring develops necessary pressures. The question of how much pressure is necessary is therefore a separate one for each roll in the drawing and spinning rooms. Springs are not always uniform, some overseers assert. They ridicule the use of special devices and gages to equalize pressure on all rolls. Equal pressures by hand have been tried on a line of back rolls in the spinning previous to testing with a yoke and spring scale. Tests revealed almost 50% variation. Tests made on spinning frame front rolls have shown that the pressure varied from 180 to 350 lbs. A little extra pressure is good practice, for by its aid roller slip and cut rollers are avoided which are productive of uneven work and cockly yarn.

We are trying to prove the point that under present conditions no standards can be made that will be suitable for every mill. We do agree with you that too much pressure is used, generally, throughout worsted drawing and spinning. Most men are afraid to reduce the pressure permissible when using cork-covered rolls. However, some overseers and superintendents are fully aware of the advantages of cork covers and obtain efficient drafting with much less pressure than that required for leather-covered rolls.

You will have to set your own standards for pressure. Then if you desire to have a similar compression of all springs for each operation, a special gage can be supplied by Prince, Smith & Sons, which is permanently set on each tension hook. Or you may make a gage capable of measuring the spring when under compression. The only fly in the ointment would then be that of the standardization of the springs.

To determine the necessary pressure, first have the customary "tightening" made, then gradually remove pressure until there is evidence of roller slip. The pressure should now be increased until defects disappear. This will represent the minimum pressure without a safety factor. How much to allow is a personal matter. We suggest 20%. Measure the free length of the spring; compare this with length of spring when under compression using minimum pressure. Suppose that a spinning frame has been tested as outlined and compression necessary equals 5/16 in. Try 20% increase making 6/16 in. compression. One turn of the butterfly nut would give the required increase if 16 thread is used on tension hook screw.

If you insist upon a standard compression you will find it necessary to pay more attention to the variables mentioned previously. In addition, top roll boss diameters, thickness of roll covering, and roll lubrication will require particular attention. Different standards will be required for leather-covered chrome, oak, and soft leather covers, and for rubber and cork covers. Even after all this care, each section-hand must be permitted to increase individual pressures when results make it necessary. We would rather err on the side of excess pressure than use too little pressure.

* * *

Knitted Fabric

Technical Editor:

I am sending a piece of cloth. Will you please tell me how it is knit. Has it a special burr to make the long stitches? (6582)

This fabric is knitted on a loop-wheel machine using two loop wheels per feed. One draws a normal length of loop and the other draws a very long loop. This is of the general type such as is used to knit stockinette or astrachan, but no plugged or leaded wheels are used. In this sample the wheel making the backing loops uses about two and one-half times the length of yarn used on the normal loop wheel. It will probably be desirable to use a shoe pressure on this type of work.

* * *

Schappe and Spun Silk

Technical Editor:

A question has just come up as to the exact difference between schappe and spun silk. I have read that schappe is made in Europe and spun silk in America. I have also read that there is a difference in the way that the waste is prepared for spinning. The writer would like to know what you consider the difference is. (6585)

The difference between schappe and spun silk is that schappe contains from 7 to 10%, and sometimes 15 to 20% of silk gum that is left in the yarn. This gum or sericin gives the schappe yarn a dark color.

Spun silk as made in the United States contains from 1 to 4% of gum, according to the method of degumming or boiling-off. A good boiled-off silk as made here has a clean, bright, and lustrous appearance, and is ready for weaving or knitting into various fabrics or mixtures that do not require a boiling-off process in the finishing of the fabrics.

A schappe yarn should always be tested to determine the amount of gum left in the yarn. Otherwise, if woven into cloth with the various percentages of gum as mentioned above, the cloth in the dyeing and finishing operations will develop streaks which are generally blamed on the dyer, though in reality are caused by a mixed quality of yarn or by various percentages of gum having boiled out of the yarn. Schappe goes through a macerating process for rotting the gum off the fibers, also to leave the silk soft so as to be able to work it through the various machines for spinning. In the macerating process the water never reaches the boiling point but is kept as near as possible at 100 to 120° F. The water is circulated by drawing it from the bottom of the macerating tank and depositing it again on the top of the silk. It takes four to six days to macerate a batch of raw silk waste, according to the amount of gum to be left in the material. If the water gets too hot, the silk fiber is made weak due to the long treatment, so the temperature of the water must be kept between 100 and 120° F.

Spun silk made by the boiling-off process will be degummed in less than two hours. There are various methods

TEXTILE WORLD,
334 Fourth Avenue,
New York City.

Gentlemen.—We appreciate receiving your letter of August 7th and wish to express our thanks for your co-operation in the matter of

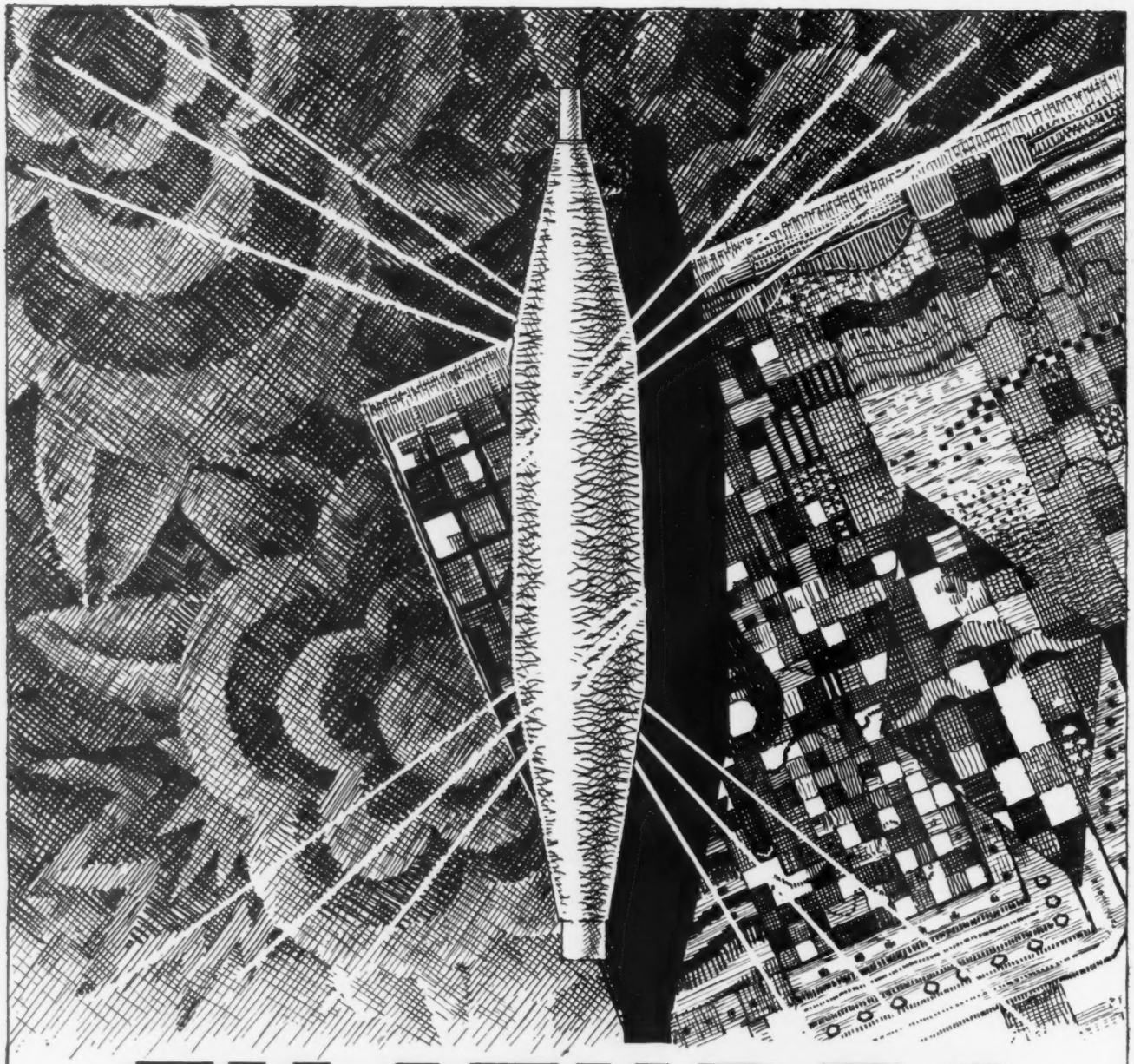
Very truly yours,
PARAMOUNT TEXTILE MACHINERY CO.
By G. C. Kautz.

In this department, we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to TEXTILE WORLD. Inquiries should give the fullest information and data possible. In the case of damage to material, a sample should be sent. In this way answers can be given which will be of immediate technical value to the correspondent and to others in the same line. Inquiries pertaining to textile processes, machinery improvements, methods of management, the markets, etc., are especially invited as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith. The identity of those seeking information on technical subjects will not be disclosed.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.

Letters expressing opinions or voicing criticism will be signed by the correspondent's name unless the letter itself contains a request that the name be withheld.

For prompt service, technical inquiries should be sent directly to the Technical Editor, TEXTILE WORLD, 65 Franklin St., Boston, Mass.



FILATURES PROUVOST & Cº

LA LAINIÈRE DE ROUBAIX

SPINNERS OF WORSTED YARNS FOR WEAVING AND KNITTING. SPECIALTY YARNS FOR THE SILK TRADE (CRÊPES, VOILES, POPELINES, BENGALINES, CABLÉS, ONDULÉS, BOUCLETTES, ETC...). ALL KINDS OF COMPOSITION YARNS : SILK, RAYON, COTTON, CAMEL HAIR, AND MOHAIR MIXTURES. — SOLE DISTRIBUTOR FOR U. S. A. : FRANCO-AMERICAN TEXTILE Cº., INC. 448, FOURTH AVENUE NEW YORK N.Y. PHONE : ASHLAND 0021. — REPRESENTATIVE IN CANADA : P. B. HART, 12, MAYOR STREET, MONTRÉAL.

DRAEGER

Correspondence with Readers—Continued

in degumming silk waste: the macerating process, the soap foam process, the boiling-off process, and degumming by steam in a vacuum tank; also various acid treatments and chemicals. But up to the present time nothing has been developed that will degum silk better than soap and water, without damaging the fibers.

It should be said that schappe is also made in the United States when called for. The difficulty is in getting rid of the noils containing the gum at a remunerative price.

* * *

Lace-Machine Fabric

Technical Editor:

Enclosed you will find sample of knit tissue. We would like to have information as to the type of machine used in the manufacture of this. (6583)

The sample sent is not a knitted fabric. It is a product that can be made on several types of lace machine. If the balance of the piece of goods has no figure or design other than the mesh, the chances are that it was woven on a plain net machine which has no jacquard attachment. The presence of a design would indicate that it had been made on either a "Levers" machine or a "Curtain" machine, both of which are equipped with jacquards.

* * *

Streaks in Full-Fashioned Hosiery

Technical Editor:

I am sending a full-fashioned ladies' hose made with 14-thread Japan silk. Will you tell me, if possible, what it is that causes the streaks? These goods have been boiled out with olive oil soap for one hour, given two waters at 160° F., and dyed. After dyeing they are rinsed and given to finish. The soaking bath for the silk is made of oil and soda, and the silk is soaked over night. These streaks appear in all shades in this weight of hose. What information you give will be appreciated. (6586)

The lines are caused by one of two things. The stockings are being worked too hard and too long in the dyetubs, as redyes might be; or they are too dry when boarded, which would show as in the sample. The writer leans to the opinion that they have been overworked and chafed in dyeing.

* * *

Rayon Rubbed off Stocking

Technical Editor:

We have a complaint from one of our hosiery customers on rayon which we shipped them on account of the rayon being frayed or rubbed off on the surface of the stocking. We are enclosing several sample stockings illustrating this complaint. It is our opinion that the yarn is damaged on account of not being properly handled in the boarding process. It is possible that the stockings are boarded before being properly dried after the wetting process. You will notice from observation that it seems that all of these stockings are damaged at the bottom edge of the foot, at which place we think the stocking is handled the most in boarding. We would like you to examine this fabric and let us know what in your opinion is the cause of this trouble. (6584)

We believe that the inquirer is right in his opinion. The hosiery may have been poorly hydro-extracted. As the boarder usually pulls on the hose at places such as the foot or above the heel, the rayon being wet might fray considerably at such places. To remedy this fault, have the wet-out hose extracted twice the usual time, then laid out in the drying rack for several hours before boarding. Or allow the hose to lie over night and sprinkle the next day before boarding.

There is a possibility of the tension being too great on the rayon in knitting, causing weakened spots that will fray easily. There is a chance of rayon being weak from the bleaching action, although this rayon appears to be a natural color.

* * *

"Japanese Super-Intelligence," a One-Act Play

Our mail the other morning contained a drama for our little theater with the above title. The author is H. F. Hofer. The play follows:

Scene: Sericin Ave.

Mr. A. Good morning, Mr. B.

Mr. B. Good morning. May I be allowed to remark that the Japanese are super-intelligent?

Mr. A. That being your conception, how do you explain it? Do you mean to say that the Japanese as a race are more intelligent than the American?

Mr. B. I'm speaking not merely of the Japanese people. Even their animals seem to have it over ours—at least their horses, even though their present-day breed, as far as looks and build are concerned, is rather poor.

Mr. A. Japanese horses? More intelligent than our thoroughbreds! Man, —But then, I suppose I had better wait for your exblanation.

Mr. B. Now, don't you make the mistake and misquote me. I cannot, with any authority, speak about the Japanese people in general. Those of them that I know are only or particularly the silk men, raw silk men, many of whom I came to know by reason of many years' daily and constant contact. But even so, on the strength of that experience alone I might not have been prompted to allude to Japanese super-intelligence. My own conception appears confirmed by the experience of the members of the American Silk Association's Technical Committee recently returned from Japan.

Mr. A. In what way?

Mr. B. By their admission that the Japanese raw silk men had succeeded in convincing the American committee members of many erroneous preconceptions and shortcomings.

Mr. A. But then, is it not natural that Japanese raw silk men should know more about raw silk than the American who probably has never been inside of a silk filature?

Mr. B. Quite so, and that is the reason for my taking greater stock in Japanese silk men's ideas about raw-silk classification.

Mr. A. But what about those celebrated Japanese horses?

Mr. B. Oh, as to that, Well, I remember an American silk man coming to Japan and telling the reelers that sizing tests for evenness were of no use by reason of the fact that the Japanese reeling girls had become so clever as to be able to reel 450-meter lengths of thread at the rate of 225 meters, 10 deniers, and 225 meters, 18 deniers—resulting, when weighed together, in an average size of 14 deniers, this being misleading as to evenness.

Mr. A. But, even admitting that while there is theoretical logic in the conception, practice totally refutes the presence of reason. You have switched off from the point at issue. You are now talking of the Japanese reeling girls, whereas you were to tell me the story of the Japanese horses' super-intelligence.

Mr. B. Quite right, I was going to, only you interrupted me. The thing is this: The American silk man in question discussed that theory with a certain Japanese silk reeler while partaking of a repast served in the open in front of the respective reeler's factory. At that particular time a load of cocoons drew up, drawn by one of those stubby, ungainly looking Japanese dray horses. The reeler, true to the proverbial Japanese politeness, listened patiently without in the least divulging amusement created by the American's inadvertent reference to the Japanese reeling girls' attributed uncanny cleverness. The horse, however, ignorant of etiquette, burst out into a peel of laughter, and might still be laughing had it not died laughing on the spot.

Mr. A. Indeed, clever horse but for the mistake of laughing itself to death. But then, what has become of the theory of size deviation as a test for evenness?

Mr. B. So far as I know, the Silk Association of Japan, by a resolution adopted sometime during the month of April of this year, approved of the test as the official test for evenness, and since then the recently organized National Raw Silk Exchange incorporated the test as an auxiliary test to its classification scheme.

Mr. A. That, then, might lead one to believe that there ought to be a measure of merit in the test, even though it was first denied it.

Mr. B. That indeed would seem so, particularly when you attach significance to the comment made by the recently returned members of the American Technical Committee from Japan to the effect that the raw silk men met in Japan connected with the Research Division of the Japan Raw Silk Association were men possessed of greater knowledge than had previously been attributed to them.

Mr. A. Is there any reason to think that size deviation as a test is as effective as the so-called seriplane test for evenness?

Mr. B. As to that, books might be written; but suffice it to say that the seriplane test can show nothing not divulged by the size deviation test. Where the two differ is in the fact that the former permits of result interpretation by arbitration only, whereas the latter embodies automatically fixed, distinct interpretation free from human element and free from outside considerations.

Mr. A. That being so, would not that mean an ideal test, just the test to shut out wrangling over disagreements?

Mr. B. More than that, it is the only possible test automatically to give evenness parity on any size.

Mr. A. What do you mean by that?

Mr. B. Oh, as to that. Well, I reout beforehand when a 4-thread 20-22 denier yarn gives me evenness at par with 6-thread 13/15, etc., etc.

Mr. A. But that, I suppose, I could do in connection with any other evenness test.

Mr. B. You suppose so. Well, if supposition answers your purpose, then, yes. I did "supposing" too, but found it wanting.

Mr. A. Tell me, is that size deviation test original with Japan raw silk men?

Mr. B. Original in connection with official approval, but in essence it was first submitted to the Silk Association of America by an American silk man some time around 1913.

Mr. A. And it slumbered during all this long lapse of time?

Mr. B. Well, you see, it wasn't sufficiently advertised.

Sees 1880 Modes as Inspiration of Current Styles

The revival and adaptation of 1880 modes and the vogue for two or more colors in a costume were stressed as important style developments by Miss Esther Lyman, fashion counselor of Cheney Bros., in a talk at Westport, Conn., on Sept. 12. Miss Lyman's address was a feature of a benefit program sponsored by society people of Westport and attended by a large audience. The points she emphasized were illustrated by a fashion show.

"In making silks, Cheney Bros. really make dresses," Miss Lyman said, "for silk must be visualized in and adapted to a smart costume before it has any value whatsoever.

"Fashion interests this fall centers about fabrics and colors. The 1880 period from which French dress designers are drawing inspiration spotlights many stiff silks, such as taffeta, moire, failles and stiffer, heavier satin. In this period we also find many laces, nets and tulles. Couturiers are reviving these fabrics, but using them in new ways. The bustle appears but in a modern version and lace is not used in ruffles and frills for trimming, as in 1880, but as a fabric, often for the whole dress or for an insertion to emphasize a line."

Testing Accessories

(*Continued from page* 43)

16s cotton count, and 24s worsted count. The results of these are given in ten tests each, set out as they are made on the machine and thereafter given in a frequency line.

The tests on the 300 denier viscose gave the following results: 101, 98, 103, 103, 102, 101, 105, 103, 102, 103. The limits of variation lie between 98 and 105, and the figures are shown in graphs 14 and 15. The acetate yarn of same count, 300 deniers, gave the following: 83, 60, 75, 83, 82, 78, 81, 85, 79, 87. These figures are set out again in the graphs at Fig. 16, the black line giving the tests as they were taken, while the dotted line shows them arranged in their frequency. The 16s cotton counts showed the following range of results: 18, 15, 25, 17, 17, 20, 17, 18, 19, 24. These are shown in graphs at Figs. 17 and 18. The results on the 24s worsted yarn in inch-pounds are as follows: 24, 22, 23, 24, 23, 21, 20, 24, 22, 25. A graph for these is given in Fig. 19; and the frequency of each number, in Fig. 20.

FACTS

A new mill started operation with our 24 section Reading machines more than a year ago. These machines are operated in two shifts . . . . practically 24 hours per day. Production, ranging from fourteen to sixteen dozen per machine, per shift, has been uninterrupted.

RESULTS:

Low costs per unit

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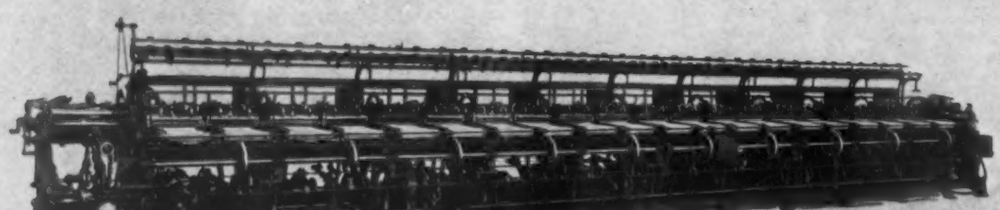

READING

FULL-FASHIONED KNITTING MACHINES

See Also CONSOLIDATED TEXTILE CATALOG

MILL NEWS

COTTON

New Construction and Additions

***California Cordage Co.**, Orange, Cal. The one-story, 60 x 130 ft. addition which this company is building will be in operation on Nov. 1. Machinery for the plant has been purchased.

***Pepperell Mfg. Co.**, Lindale, Ga., is enlarging its cloth room to 75 x 100 ft. No new machinery will be purchased.

Taber Mill and **Butler Mill**, New Bedford, Mass., have purchased respectively 48 and 32 combers from the Manomet Mills, New Bedford, now in liquidation.

***Newmarket (N. H.) Mfg. Co.** The 75 new Stafford automatic looms which this company is installing will be in operation about Oct. 1.

***Norris Cotton Mills Co.**, Cateechee, S. C. The 9000 new Whitin spindles which this company recently installed will be in operation on Nov. 15. The company has also replaced 2 pickers and 2 intermediate lappers with Whitin two process pickers and has added 12 deliveries Whitin drawing and 1 Lowell slasher.

***Gaffney (S. C.) Mfg. Co.** expects to complete construction of its new building by Oct. 15. Installation of looms will be started the latter part of September. The new machinery will be installed at the rate of 250 looms a month. About 450 old looms will be junked, making a net increase of approximately 400, which will raise the total from over 1,800 to more than 2,200.

***Valley Cotton Mills**, Harlingen, Tex. It is expected that this new mill will be in operation about Jan. 1. Arrangements are now being made for shipment of machinery from New Bedford, Mass.

Fact and Gossip

***Quidnick-Windham Mfg. Co.**, Willimantic, Conn. A 12½% dividend amounting to $54,000 has been authorized creditors of the Quidnick-Windham Mfg. Co., by Justice Tanner in the Superior Court. The dividend is the second paid and follows a 25% dividend Dec. 21, 1927. Walter B. Knight and Charles H. Newell, receivers, were authorized permission to sell two lots of real estate, Coventry, R. I., for $2,700.

Bauer & Black, Chicago, Ill., has been merged with the Kendall Mills, Inc., Boston, Mass., and the Lewis Mfg. Co., Walpole, Mass., a subsidiary of the Kendall Mills, Inc. Although each of the concerns will retain its separate identity for trading purposes, a new corporation has been formed as a holding company which will be known as the Kendall Co.

York Mfg. Co., Saco, Me., has abandoned the idea of liquidation. Through the efforts of Mayor W. T. Emmons the industry will continue at reduced capacity. Taxes of the company were reduced $20,000 during the past year and $40,000 the year previous so that the industry would continue to function.

Lockwood Co., Waterville, Me. After a 10-day shut down the Lockwood Co. has gone on a 4-day-a-week schedule.

Otis Co., Bondsville, Mass., has changed the working schedules and now shuts down at 10 a. m. on Saturdays. The number of hours weekly remains the same.

Fisher Mfg. Co., Fisherville, Mass., has been notified that its town taxes have been reduced from $41,476.70 to $27,949.61, due to the junking of 19,000 mule spindles.

***County Moore Mills, Inc.**, Hemp, N. C. Judge Johnson J. Hayes, of the United States Middle District Court, signed an order requiring the County Moore Mills, Inc., to show cause why a judgment of bankruptcy should not be entered. Claims totalling $3,000 were made by Sugg Bros., the Industrial Rayon Corp. and Southern Franklin Process Co. These creditors had petitioned for the bankruptcy of the concern several days ago.

***Audrey Spinning Mills, Inc.**, Weldon, N. C. L. R. Gilbert is receiver for this company.

***Potter Fine Spinners, Inc.**, Pawtucket, R. I., have decreased capital stock to $800,000.

Aragon-Baldwin Cotton Mills, Inc., Chester, Rock Hill and Whitmire, S. C., have resumed operations after a week's curtailment.

***Cutter Mfg. Co.**, Rock Hill, S. C. Stockholders have voted to increase the capitalization of this company to $125,000.

Trenton (Tenn.) Textile Mills, Inc., which have been idle for some time, were recently sold to the city of Trenton.

WOOL

New Construction and Additions

***Firth Carpet Co.**, Firthcliffe, N. Y., has construction work progressing rapidly on its new four-story yarn mill addition which it expects to have ready for occupancy by early spring.

S. B. & B. W. Fleisher, Inc., Philadelphia, Pa. This firm, spinners of worsted yarns, 25th & Reed Sts., has awarded contract for the erection of an addition to their plant to cost $22,000. Julian S. Simsohn is the architect and contract was placed with Morlock-Davis, Inc.

***Saxton's River (Vt.) Woolen Co.** The dam of the Saxtons River Woolen Co., carried away by the flood last November, is being rebuilt from plans calculated to increase the amount of power to a considerable extent. Twelve looms with individual motor drive are being added to the equipment, and orders are in hand sufficient to run the mill night and day for several months.

Fact and Gossip

Wuskanut Mills, Inc., Farnumsville, Mass., have had their town taxes reduced from $14,427.19 to $13,412.02.

***Brightwood Mfg. Co.**, North Andover, Mass. Real estate of the Bright-

*Indicates previous mention of project.

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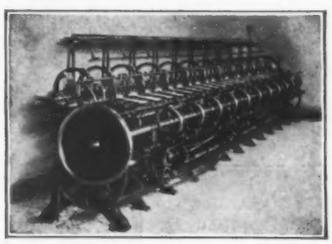

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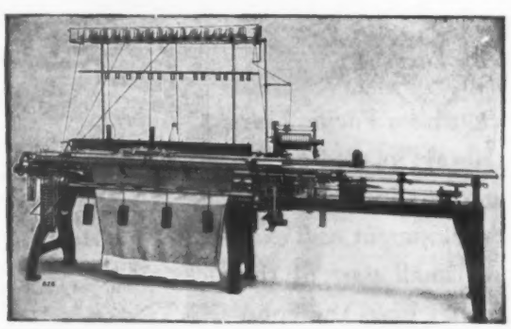

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SOUTHERN PACIFIC LINES

HOUSTON, TEXAS

Mill News—Continued

wood Mfg. Co. has been purchased by a group of local business men, who plan to rent space to new industries. Machinery had been removed from the plant previously. Purchase price is said to have been about $37,500.

Hamilton Woolen Co., Southbridge, Mass., is operating its finishing department and dyehouse day and night. The town taxes on the company's property have been reduced from $77,000 to $46,703, considerable real estate and personal property having been sold.

George H. Gilbert Mfg. Co., Ware, Mass., will pay a town tax of $34,167.98 this year on its Gilbertville, Mass., property, the valuation having been reduced $200,000. The reduction has caused an increase in the town tax rate.

KNIT

New Construction and Additions

***Volunteer Knitting Mills,** Athens, Ala. The contract for the erection of 40 operatives' houses to take care of additional employes for promised extensions to the local plant of the Volunteer Knitting Mills was let this week to the Athens Lumber Co. and the J. W. Chambers Lumber Co., each of which will erect 20 six room houses at $1,025 each. These houses will be paid for by a corporation formed by local men, the mill having agreed to build extensions that will double the present pay roll if Athens' citizens would erect 40 houses to take care of the increased number of employes. The Volunteer Knitting Mills will act as renting agent for the local housing corporation and has the option to purchase them at the end of 5 years.

***Stevenson (Ala.) Hosiery Mills,** recently reported organized, are building a one-story, 120 x 120 ft. mill to be equipped with 200 knitting machines for the manufacture of silk hosiery. Company is capitalized at $50,000 and is under the direction of C. L. Spivey, president, and E. K. Mann, treasurer.

***Archer Hosiery Mills,** Columbus, Ga. Construction of the new unit, consisting of main building, dye house, board room and office, and covering approximately 30,000 sq. ft., will begin at once. It is expected to have these buildings in operation on Jan. 1. Contract has been awarded to Ewart Bros.

***Bike Webb Mfg. Co.,** South Bend, Ind. The one-story, 190 x 224 ft. plant which this company is building at South Bend will be completed about Nov. 15 and will probably be ready for operation on Dec. 15.

***Globe Knitting Works,** Grand Rapids, Mich. The 20 full-fashioned knitting machines which this company has purchased are now in operation in the one-story, 100 x 150 addition which was built to house them.

Consumers Hosiery Mills, Inc., Sherburne, N. Y., are installing new machinery in their new plant. The company expects to be running on full time by Oct. 1.

***Hatch Full-Fashioned Hosiery Co.,** Belmont, N. C. will erect its plant on the Charlotte-Gastonia highway near Belmont Fabric Co., according to report. Contract for construction will be let this week. The mill will contain about 15,000 sq. ft. of floor space. It will be a one-story structure of standard mill construction with basement under the finishing department. R. C. Biberstein, Charlotte, N. C., is the engineer. Reading full-fashioned hosiery machines have been purchased by the company.

Nebel Knitting Co., Charlotte, N. C., is reported to be considering the establishment of a branch plant at Wilmington, N. C.

Real Hosiery Co., Hickory, N. C., is a new company which began operations on Sept. 5 in a leased building at Hickory, for the manufacture of cotton hosiery. Plant is equipped with 69 knitters, 17 loopers, 3 ribbers and 3 sewing machines. Company is under the direction of H. J. Holbrook, president and treasurer, and is capitalized at $30,000.

Adams-Millis Corp., High Point, N. C., has awarded general contract to William F. Lotz, Philadelphia, Pa., for a new three-story reinforced-concrete mill, 107 x 130 ft., reported to cost in excess of $100,000, with equipment. C. H. Fries, Philadelphia, is architect.

Columbia Knitting Mills, Portland, Ore., has completed work of repairing the plant after the fire of July 17. Repairs to the machinery are still under way. About $15,000 has been spent in putting the show-rooms and mill in shape but the machinery costs will be considerably more than that, according to Adolph Friedenthal, general manager. Day and night shifts have been employed to catch up on orders.

Atlantic Hosiery Mills, Inc., Philadelphia, Pa. Notice of incorporation of this new concern was recently given in these columns. The company has taken quarters at 3915 Powelton Ave. They manufacture children's hosiery. Their equipment consists of 16 ribbers, 8 knitting machines and 3 loopers. They sell to jobbers and buy silk, rayon and mercerized yarns, both E. S. Troupin, president, and Harry Latch, secretary, doing the buying. Company is capitalized at $25,000.

***Oakbrook Hosiery Mills, Inc.,** Reading, Pa. Contract for the five-story and basement, 98 x 225 ft. addition to the Oakbrook Hosiery Mills, has been awarded to the Fink Construction Co. Building operations have begun. The addition will cost about $40,000 and represents the first unit of a general expansion program.

***National Hosiery Mills, Ltd.,** Hamilton, Ont., Canada. Work has begun on the erection of a $100,000 plant for the newly organized National Hosiery Mills, Ltd., which will have a floor space of 26,500 sq. ft. and a dyeing house, located at Dundurn and Chatham Sts. on a site of 3½ acres. The mill proper will be two stories in height with provision made for additional ones. Silk and wool hosiery will be manufactured.

Fact and Gossip

New England Knitting Co., Winsted, Conn. E. B. Gaylord has been elected president of the New England Knitting Co., to succeed the late L. W. Tiffany. Robert E. Gaylord was named to fill the vacancy on the Board of Directors. Irving C. Valentine was appointed general superintendent of the company. Officers will serve until the next annual meeting of the company.

Arrow Silk Hosiery Co., Inc., Irv-

* Indicates previous mention of project.

Mill News—Continued

ington, N. J., has arranged for an increase in capital from $200,000 to $300,000, of which $50,000 will be preferred stock, and $200,000 common stock.

Textile Knitting Works, Inc., Brooklyn, N. Y., began operations on Sept. 17 in the plant they have leased at 44 Lafayette St., Salem, Mass. The company has taken a 9-year lease on the three-story building and has moved all equipment to the new location.

Walnott Knitting Co., Utica, N. Y., is enlarging working force with a 24-hour daily operating schedule in effect.

Hornberger & Specht Mfg. Co., West Reading, Pa., is the name of a new company reported to have leased space at Third and Franklin Sts. Herbert Hornberger, former superintendent of the Mohnton (Pa.) Knitting Mills and George Specht are said to be the organizers of the company.

Neatfit Knitters, Reading, Pa., have discontinued business, disposed of the equipment and vacated the building.

Tamaqua (Pa.) Underwear Co., Inc., since adding a complete line of rayon underwear to line of manufacture have put on a force of night operators and are working day and night.

*__Golden Rule Hosiery Co.,__ Providence, R. I. Property of this company will be sold at a sheriff's sale this week to satisfy the $4,500 claim of the Thurston Mfg. Co., which owns the building.

Penman's Ltd., Paris, Ont., Canada. The 7 plants of this company are reported to be operating full time.

SILK

New Construction and Additions

*__Dixie Throwing Co.,__ Greensboro, N. C. Joseph L. LeBauer, an official of the Dixie Throwing Co. which is to begin operations in its new plant at the corner of Bruce St. and Oakland Ave. in the near future, has arrived in Greensboro. Accompanying Mr. LeBauer was G. W. Myer, an expert machinist of Paterson, N. J., who will be in charge of the work of installing the machinery and other equipment. Installation of machinery will begin this week. Myer Grobart, president of the company, of Paterson, and John Hauck, superintendent, have also arrived.

MacGowan Brothers, Inc., Beaver Meadows, Pa., have awarded a contract to S. P. Kraft, Weatherly, Pa., for a one-story addition, reported to cost about $25,000. Additional equipment will be installed.

Bernesco Silk Co., Inc., Berwick, Pa., is placing machinery in its mill in Berwick. This is a newly organized company which is starting operations doing commission weaving. The present location has sufficient floor space for 36 looms, winders, warpers and other machinery. H. E. Wenrich, formerly superintendent of the Washington Silk Co., Berwick, has been appointed manager of the new company. There is additional ground to allow for increasing the size of the present building. Company is incorporated for $50,000.

*__Welwood Silk Mills, Inc.,__ Sparta, Tenn. This new mill will house 170 looms at first, but the plant has been designed for expansion. The company is revamping an existing building at McMinnville, Tenn., and installing a silk throwing plant, and is reported to be considering the construction of 3 or 4 additional plants in other Tennessee communities. Robert & Co., Inc., Atlanta, Ga., are the engineers.

Puritan Silk Co., Inc., Grottoes, Va. An adjoining block in the present location has been secured by this company, according to report, and expansion will begin soon.

Fact and Gossip

M. Cooper & Co., Inc., Paterson, N. J., recently organized with capital of $125,000, to manufacture broad silks, will be represented by Morris Cooper, 132 Market St., Paterson, principal incorporator. Others interested in the company are Samuel M. Anisfield and Leo Chrisman, both of Paterson.

*__Whitehead Silks, Inc.,__ Harrisburg, Pa., is the name of a company formed by George and William C. Whitehead, of Harrisburg, to operate a silk mill. Location of the plant has not been announced but it is reported that the building formerly occupied by the Harrisburg Shoe Mfg. Co. will be selected. The company is capitalized at $50,000. William C. Whitehead is treasurer of the company.

Amalgamated Silk Corp., Kutztown, Pa., has put on a night shift. The plant is being electrified throughout, but the steam power apparatus will be kept in condition for use in emergencies.

RAYON

Fact and Gossip

South Boston, Va. It is probable that South Boston will soon get a rayon plant, as a special committee, appointed by the City Council for the purpose, is now in New York in conference with the promoters. It is stated that the rayon company will invest about $10,000,000 in the new enterprise and that employment will be given to 2,500 persons. The committee is composed of Holt Easley, J. Russell Jones, and John W. Hardy. The name of the rayon company, has not been made public as yet.

DYE, BLEACH AND FINISH

New Construction and Additions

Bellman Brook Bleachery Co., Fairview, N. J., is installing 3 six-color machines and 1 eight-color machine for printing. These machines will be in operation by Oct. 15.

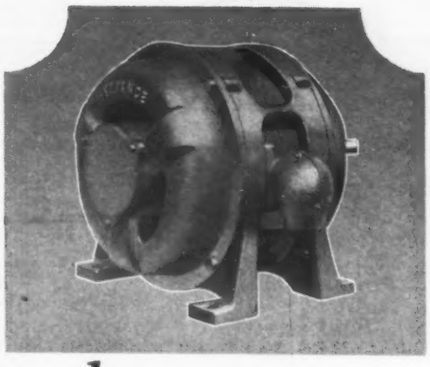
Acme Finishing Co., Pawtucket, R. I., has secured a permit for a one-story 25 x 40 ft. addition to its filter plant on Front St.

W. Robinson & Son Converters, Ltd., Woodbridge, Ont., Canada, plan to increase production of their mill by building an addition to house additional machinery.

Fact and Gossip

*__Arnold Print Works,__ North Adams, Mass., are preparing the plant of the Renfrew Mfg. Co., Adams, Mass., which they recently purchased, for operation. The company plans the development of a collateral but non-competitive line to supplement the product at North Adams.

*Indicates previous mention of project.



Another . . money-saving motor

THIS new Reliance Across-the-Line Motor can be thrown directly on the line with the simplest type of manually-operated switch or push-button starter. It's a real money saver because the starting equipment is simpler, affords greater convenience, requires fewer replacements and much less attention.

Sizes 7½ — 30 horsepower. For 2 and 3-phase circuits.

Investigate before you buy motors within this size range.

Cost with push-button control is no more than for ordinary motor with compensator.

Bulletin 1093 gives details

RELIANCE ELECTRIC & ENGINEERING CO.
1060 Ivanhoe Rd., Cleveland, O.
Branches: Boston, New York, Buffalo, Pittsburgh, Philadelphia, Birmingham, Cincinnati, Detroit, Chicago, St. Louis

RELIANCE A-C D-C MOTORS
with Ball Bearings

FIG. 20.

OBLONG BASKET

Standardize on

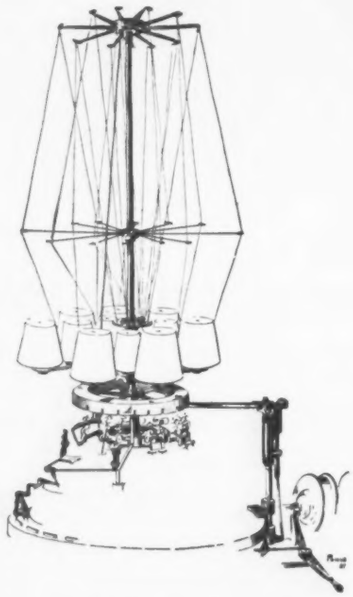
LANE CANVAS BASKETS

For All Mill Operation

A Style for Every Use

W. T. LANE & BROTHERS
Manufacturers
POUGHKEEPSIE, N. Y.

Crawford



"B" Control
Stop Motion

CRAWFORD STOP MOTION

TO put out more and better cloth each day . . . with the holes and press-offs that cause "seconds" totally eliminated. Isn't that alone worth the slight initial investment of installing the Crawford "B" Control Stop Motion on your knitters?

This simple device won't let a single piece of foreign matter meet your needles . . . for it halts the machine the moment trouble appears

Fits both stationary and revolving head machines, this specialized Crawford . . . *Write us*

See Also CONSOLIDATED TEXTILE CATALOG

THE CRAWFORD MFG. CO.
NEW BRUNSWICK·N·J

G S

GOLD CIRCLE NEEDLES

NO MORE ROUGH RIVETS

Our new needle with the rivet Brazed to the cheek does away with them. The needle lasts 3 times as long.

More and Better Knitting

because they are always smooth.

If you have not seen these improved needles or tried them, ask for samples.

Patent applied for

MANUFACTURED BY
GRANITE STATE NEEDLE COMPANY
LACONIA, N.H., U.S.A.

N C

KNIT GOODS

Underwear Men Count On Pull-Over Demand

Knitted Shirts and Running Pants Good for Several Seasons—Women's Rayon Goods

Leaders in the underwear market look for a strong spring season on pull-over athletic shirts and shorts, especially pull-over knitted shirts. According to them the advent of this style is nothing radically new, for they have seen it grow over a period of years and even should the vogue for fancy striped effects in the shorts lose popularity, the style itself of the track pants and shirt should remain good for same time to come.

There is no reason why the fancy styles cannot maintain their present position if manufacturers will strive to keep quality predominant and study styling with an eye to creating a stronger sales appeal from this angle rather than from the angle of price. Shorts for women are being shown in some retail stores but have not as yet been in any real demand and even those producing such garments cannot expect any real volume of business.

Volume in Women's Rayon Goods

Rayon knitted garments for women still hold the volume of business which has been received for some time and manufacturers of this style using a branded non-lustrous rayon, are meeting with good success.

About all that is needed now for knitters and selling agents producing medium and heavy weight goods to close the fall season is some early good snappy weather and then real buying should take place for immediate delivery.

Spring business is still lagging and until jobbers have bought and sold their entire stock of fall and winter numbers, business for spring delivery cannot be expected in any real volume. Whether the jobber buys today depends on what he knows the retail buyer will accept and when the ultimate consumer holds off buying, business all along the line is retarded for the jobber has taken the attitude that he will not stock any amount of merchandise. It is possible that he may be wise in not wishing to "hold the bag," but nevertheless the fact remains that he loses his real identity and status as a jobber by adopting this attitude.

Lanett Bleachery & Dye Works, West Point, Ga., will put its new steam plant in operation about Jan. 1, work on the plant being approximately 60% complete. The plant will generate 1,500 k.w., using extraction type turbine. J. E. Sirrine & Co., Greenville, S. C., are the engineers.

Initiative at Premium in Hosiery

Too Many Copyists in Fancies—Controversy on Length of Women's Goods

WHEN asked this week just what seemed to be an outstanding cause for the upset condition in the half hose market a leading manufacturer answered: "Lack of originality."

Need More Initiative

To some it would seem that there had been too much originality, but as the speaker expressed it, he did not mean copying the other man's styles and trying to imitate patterns which the mill was not properly equipped to make. Rather he meant the inability of most manufacturers to take a step showing real initiative. There has been altogether too much of waiting to see what someone else was going to show and then trying to jump in the market with a product priced considerably lower than the original until the market is flooded with cheap merchandise all of a likeness causing an overproduction and a complete killing of the style and the value of the special machine upon which it was made. This has happened time and time again, and manufacturers cannot surely stay in business long if they continue policies which cut the life of a machine costing many hundreds of dollars, to a very short period and render the machines useless for anything other than the very cheapest type of goods.

Along with this abuse too many manufacturers have piled up large quantities of certain styles without knowing exactly where they were going to be disposed of. This condition is followed by a flood of distress goods for which makers seemed glad to receive almost anything.

To manufacturers of integrity who produce with the idea of building and maintaining a reputation for quality and honest values, such tactics have been a real cause for complaint.

The last few years have brought many problems to mills and selling agents, for during the craze for fancies there has and still is a marked reticence on the part of jobbers to buy in advance of their actual needs. Some jobbers claim that more hosiery is bought when there is a large variety of patterns, while others are asking for more conservative and neater patterns. As stated last week the better grades of hosiery are being shown in clocks, vertical stripes and neat embroidered effect patterns. If one can judge by the past, history should repeat itself here. The leading patterns are always brought out in higher priced goods until a certain surplus is produced and then these patterns appear in the cheaper plaited and cotton numbers. It seems that the styles of fancies are now following this trend. They are lending themselves more in accord with the increasing understanding, among all types of men, of the proper relation and coordination of accessories to the complete attire.

Controversy on Lengths

Recently considerable controversy has taken place relative to variation in the lengths of fashioned hose and the need to standardize same.

It will be remembered that in 1924 a standard length for full-fashioned hose was established at 27½-in., but it is evident that this has been forgotten by many or at least is not being adhered to.

Of course styles have changed even in the span of the last four years and as women's skirts became more abbreviated each year, jobbers have insisted upon 30 to 33-in. hose to use the length as a selling point. Even so it has been found that for the average woman such lengths are far too long and reach proportions of opera length hose unless they are of the sheerest chiffon which have practically no elasticity and so should be about 30-in. When hose is of excessive length, women are forced to place garters into the silk boot instead of into the welt causing almost immediate runs and many complaints about the hose.

To counteract this and also be the means of saving valuable silk to manufacturers, a table of lengths varying with sizes was offered by one manufacturer. Another, however, asserts that such a plan is impractical because of complications in the knitting room and has substituted a simpler plan of two lengths, 28½-in. for sizes 8 to 9, and 29½-in for sizes 9½ to 10½. A canvass of manufacturers and selling agents discloses that most agree any such lengths as 30 to 33 in. are far too long for semi-service or service hose in either full-fashioned or seamless and that when properly constructed either type of hose should not be over 29-in.

The statement was made by a practical knitter that only one length should be run as enough complications were caused by the variation in lengths on the machines. Full-fashion frames, though the most accurate of any, vary ½ to 1-in. in legs produced, and seamless as much as two inches, caused by variations in yarn, speeds, tension, temperature, humidity and many other causes.

The Seasons' Colors

Colors in women's hose are following the trend of the season's dress materials and shoes, and while such shades as grain still maintain a strong position, light gun metal and browns including tan shades are gaining steadily as fall is advancing.

It has been evidenced that some manufacturers will again attempt to put over the mesh or fish net style both in expensive full-fashioned numbers and seamless styles made on the spiral float machine and it remains to be seen whether any greater degree of success will be met than was had during last season.

Business in general is very much the same as during the previous few weeks with fill-in orders for fall merchandise constituting a fairly good proportion of what is done.

Bathing Suits Start

New Season Goods Well Received Because of Styling

It has been stated by leading manufacturers of bathing suits that the new styles recently shown are taking exceptionally well with buyers. The entirely new type of seamless suit is having the finest reception which can be expected for so early in the selling period.

By all signs this should be an exceptional year in this market, for the continued warm weather through to the first of this month cleaned practically all of the stocks of both retailers and jobbers and instances were reported where the jobber needed goods badly during the final period.

The styles are well worth noting for real care has been taken to make the garments well tailored costumes with many manufacturers centering their efforts to make even more popular typical swimming suits of the speed suit type.

Style in Fall Knit Underwear

Campaign to Advance the "Shirt and Long" for Winter

The Merchandising Department of the Knit Underwear Industry maintains that every man in the United States should change his type of underwear in the fall and winter of the year, from that worn during the summer months.

In summer the majority of men wear either the two-piece combination with knit pullover shirt or the light weight union suit. These are largely of the athletic type without sleeves and reaching nearly to the knees.

Knit industry departmental studies of underwear in relation to health have developed the fact that, to insure perfect health and proper body protection, in the fall of the year with its cool evenings and mornings, men should change to a garment where the drawer portion reaches below the knee. For business wear in the fall

Made in 5, 10, 25, 50 and 100 lb. Sizes

Full-bloomed Dyeing

LIVE, vigorous colors. Each one dyeing in its full hue and intensity. Never varying from specifications—never dulled or weakened.

The Strickland Paddle Dyeing Machine insures this true, unaffected dyeing of the hosiery. There's no chance of a hangover from the previous bath. The tank and paddle of this machine are easily and thoroughly scoured—they're made of monel metal.

Entrust your hosiery to a Strickland. You can bank on "full-bloomed" dyeing. You can forget about offshades, hangovers and rust marks. ***Write.***

STRICKLAND

Strickland Pattern Works, Chattanooga, Tenn.

Six Feed Rotary Jacquard Machine for Knitting Latest Jacquard Designs.

Write for Catalogue and full information

See also CONSOLIDATED TEXTILE CATALOG

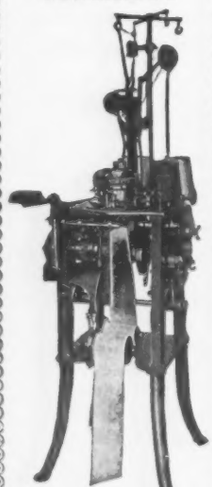
STAFFORD & HOLT

Little Falls
New York, U. S. A.

New York Office—D. Stromberg, 1204 Myrtle Ave., Brooklyn, N. Y.

NEEDLES and MACHINES OF *RECOGNIZED* QUALITY and WORTH

Acme A



Revolving Cams

are the

ACME PRODUCTS

made for

SERVICE

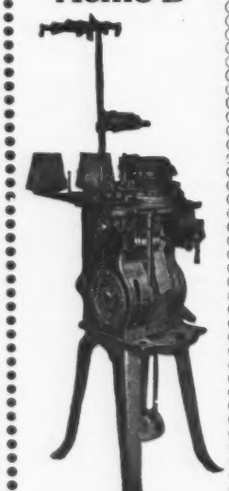
in the

KNITTING ROOM

Ask those who use them

See also CONSOLIDATED TEXTILE CATALOG

Acme D



Revolving Needles

Acme Knitting Machine and Needle Co. Franklin, N. H.

IMPORTED NEEDLES

Beckert Needles

Made by ERNST BECKERT, Com-Ges.
Chemnitz, Saxony

Continental Needles

Made by THEODOR GROZ & SOEHNE
Ebingen, Wurtt

For All Types of Knitting Machines

"Pemco" Dye Nets

Made by PENDLETON MANUFACTURING CO.
Autun, S. C.

SOLE SELLING AGENTS

E. W. S. JASPER

Successor to

CONTINENTAL LATCH NEEDLE CO.

71 Murray Street New York

Telephone—Walker 1536

Knit Goods—Continued

and winter months, the preferable type is the quarter length sleeve and the top of sock length drawers. In colder climates or where weather changes are more acute, the preferable suit is of wrist and ankle length type.

While the weight of the garment should be governed by the occupation and the climate, in any event a heavier weight than that worn in summer should be adopted in the cooler months. However, when a man's occupation is such as to require him to be in and out of doors at frequent intervals, he should choose a medium weight wear of cotton or cotton-wool mixture, or if preferred, a silk-wool mixture.

A man whose duties require him to be out of doors practically all of the time in the winter should wear a heavier weight of cotton or cotton-wool mixture underwear, and for extreme cold weather or employment subject to chill from dampness and cold, he should wear a garment with a high percentage of wool content.

Retailers should take these facts into consideration in displaying and selling underwear, by grouping the types and weights with appropriate labels in accordance with the season of the year and the various kinds of occupation and exposure for which they are adapted. They should be able to advise the purchaser as to the type most suitable for him to wear, and this can be done without offense by the exercise of a little diplomacy and good judgment.

Style is becoming more and more a factor in knit underwear in general, and for summer weight goods has become a dominant factor. New designs in track pants and pullover shirts, new color effects, new forms of construction at the waist and shoulder in union suits, rayon and silk stripes, all have played an important part in men's styles, and these innovations, to some degree, will be introduced into the fall and winter stocks.

In the same manner that "tracknit" suits and "knit athletic" union suits attracted attention for the summer, the type of underwear that will undoubtedly receive the most attention in the show windows and underwear departments for winter wear will be a "shirt and long" with a pastel color trim at the waist and perhaps a sock length cuff leg with cuff in the same color shading, with harmonizing color scheme on the cuffs and the neck band of the shirt. It is expected that there will be shown a quarter length sleeve, three-quarter length drawer union suit, the leg and sleeve cuffs being in pastel shades with a neck and front trim to harmonize.

For young men and college chaps a new idea that will be shown will be a short sleeve sock length two-piece and union suit the cuffs on sleeves and legs having vivid colored stripes in blue, brown, crimson, etc. with harmonizing neck and waist trim.

Penmans is 60 Years Old

Anniversary of an Outstanding Canadian Knitting Company

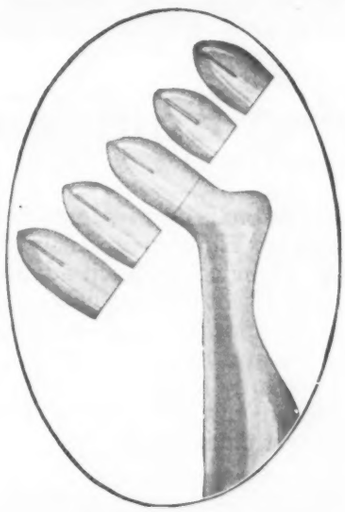
MONTREAL, CANADA.—Sixty years is a long time, as age of industries goes in Canada, for a Canadian industry to have served the Canadian public. This year, Penmans, Ltd., celebrates its Golden Jubilee.

Away back in 1868, John Penman started in business in Paris, Ontario, for himself, manufacturing chiefly stockinette which was sold by the roll and finished and fashioned by the womenfolk into the underclothing, socks and stockings, required at that time. His efforts were attended by a continuous record of success and expansion during the years that followed, through booms and depressions, steadily growing in size and importance, acquiring mills that had either failed or languished under former managements, until by 1900 his company, the Penman Mfg. Co., Ltd., was not only of great national importance, but the largest textile enterprise in Canada, and one of the largest knitting concerns in the British Empire. "Penangle" knitted products were a household commodity throughout the Dominion, and Penmans 95 and 71 and other staple lines of merchandise were firmly established in the dry goods market, with an annual turnover of upwards of three million dollars, employing several thousand workers.

John Penman disposed of his enterprise in 1904, and with it went the Penman name and trade-mark. Penmans, Ltd., substituted a strong group of industrial leaders, led by Sir Charles (then C. B.) retaining the active managerial personnel and all the traditions of the old company. Today, Penmans, Ltd., is almost unique among successful, industrial enterprises in Canada. The security behind the capital stock of the company, widely held by investors throughout the country, has steadily appreciated in value; the products of the company, in vastly greater volume and variety, are just as firmly entrenched in the market as ever before; the trade-mark is as valuable a guarantee of quality and merit as at any time in the history of the organization, and the company retains a leadership in the industry that is a credit to the industrial fabric of the Dominion.

From the hand-frame to the full-fashioned hosiery machine, from the waterwheel to the hydro-electric, from the hand-jack to the spinning frame, from the days of custom-selling to the present system of merchandising—a long journey in the history of an industry. Canadian business is extending congratulations to Penmans on its 60th anniversary.

Hellwig Silk Dyeing Co., Philadelphia, Pa. This concern, silk and rayon dyers, etc., has awarded contract for minor alterations to be made to their plant, S. W. Cor. 9th & Buttonwood Sts.



PARAMOUNT
Interchangeable
TOE FORMS
5 SIZES
ON ONE FORM

An advanced type of changeable-toe form incorporating distinctive features of superiority.

Toes are solid throughout, insuring positive heat conductivity. No air pockets or spaces to prevent rapid and uniform heat transfusion to the toe members.

Toes are interchangeable and are fastened to the forms with a positive locking device which eliminates, entirely, faults of looseness and binding common to all friction joints. Unlocking the toes for change is accomplished instantly, and leverage devices for removing toes are not required.

All tearing edges eliminated. A special jointless edge at the toe is absolute protection against thread pulling.

A precise heating arrangement delivers steam directly at the toe and assures proper heat at all times.

The superiority of Paramount Forms for hosiery drying and finishing is proved by the fact that the number of mills using them exceed, by a large percentage, the combined total of mills using all other methods.

See also CONSOLIDATED TEXTILE CATALOG

Paramount Textile Machinery Co.
337 W. Madison St., Chicago, Ill.

Sturtevant
(REG. U. S. PAT. OFF.)

Drying Equipment

The many outstanding features in Sturtevant Drying Equipment insure larger output at lower cost. Such advantages as low power, low steam consumption, positive circulation and automatic temperature and humidity control have prompted many large textile mills to install Sturtevant Drying Equipment for their particular work.

A complete drying service including the remodelling of stock dryers is offered to the trade by Sturtevant engineers. They are always ready to discuss your drying requirements and recommend equipment that will fully meet your needs.

B. F. STURTEVANT COMPANY
HYDE PARK, BOSTON, MASS.
Sales Offices in Principal Cities

The Babcock & Wilcox Co.

85 LIBERTY STREET, NEW YORK
ESTABLISHED 1868

THE BABCOCK & WILCOX COMPANY — STEAM

Water Tube Boilers — Steam Superheaters
Economizers — Air Preheaters
Chain Grate Stokers — Oil Burners
Refractories
Seamless Tube and Piping

BRANCH OFFICES

ATLANTA	Candler Building
BOSTON	80 Federal Street
CHICAGO	Marquette Building
CINCINNATI	Traction Building
CLEVELAND	Guardian Building
DALLAS, TEXAS	Magnolia Building
DENVER	444 Seventeenth Street
DETROIT	Ford Building
HOUSTON, TEXAS	Electric Building
LOS ANGELES	Central Building
NEW ORLEANS	344 Camp Street
PHILADELPHIA	Packard Building
PHOENIX, ARIZ	Heard Building
PITTSBURGH	Farmers Deposit Bank Building
PORTLAND, ORE	Failing Building
SALT LAKE CITY	Kearns Building
SAN FRANCISCO	Sheldon Building
SEATTLE	L. C. Smith Building
HONOLULU, T. H.	Castle & Cooke Building
HAVANA, CUBA	Calle de Aguiar 104
SAN JUAN, P. R.	Recinto Sur 51

BESIDES ELBOW ROOM

Industries moving to the Southeast are following generally the sound policy of locating plants near villages and towns in the suburbs of cities. This tendency is especially marked in Georgia, Alabama, and the Chattanooga District, which Central of Georgia lines serve, because the smaller communities welcome new enterprises and the cities are alive to the importance of increasing manufacturing in their trade areas. Besides elbow room, manufacturers coming into this territory gain the advantage of certain fundamental factors which make it possible to produce their goods at lower cost than in congested manufacturing districts.

Why not visit Georgia, Alabama, and the Chattanooga District, and investigate textile manufacturing opportunities for yourself? Let us know in advance of your trip, and we shall be glad to cooperate with you.

J. M. MALLORY, *General Industrial Agent*
CENTRAL OF GEORGIA RAILWAY
413 Liberty Street, West,
Savannah, Georgia

CENTRAL OF GEORGIA

Waste
A cleaner Mill at Less cost –
THE Triple Vacuum System strips four cards at a time without shutting off power, picks up every wad of waste and dirt from under **every machine in every department** and conveys that waste directly to your waste-house or waste reworking dept. though the distance be 1000 feet or more. The savings pay for the equipment.
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COOK-GOLDSMITH
TRIPLE VACUUM SYSTEM

See also CONSOLIDATED TEXTILE CATALOG

FABRICS

Less Pressure on Men's Wear

Buyers Were Active in Short Period—Worsteds Spring Leaders

HEATED activity which followed the rush of spring openings of men's wear after Labor Day is cooling off. The Jewish holidays marked the end of the period of keenest pressure, since a number of buyers finished up their initial survey of the market in the 10 business days preceding Sept. 15. The appearance of activity was largely due to the concentration of much small business into a brief period. As suggested in these columns at the time, the actual total of initial business is not much different from that of past seasons. Some houses have benefitted to a fair extent, while others are disappointed in the lack of results.

As usual buyers find matters to criticise, but for the most part the criticism concerns the manner of opening rather than prices or styles. The confusion incident to the showing of various classes of materials at one time seems to be the chief objection. If the goods could be segregated into classes such as woolens, medium and low grade worsteds, and fine woolens and worsteds, and made uniform as to date as regards those classes but with a week or so between to separate them, it might well be that buyers' criticisms would be answered and that things would be simpler to handle for many selling offices.

Market authorities foresee the coming spring as a worsted season as has been true of several recent spring seasons. Not only has the currency of tropical worsteds sufficient weight to make worsteds important, but other worsteds are being given more interested attention by buyers than are the general lines of woolens. The style vogue of small neat effects and weaves showing careful handicraft, gives worsteds an advantage of which makers of these lines are taking fullest advantage. Even in the field of popular priced suits there is considerable insistance on worsteds and there are available more than ever a wide variety of well styled worsted lines from $1.50 to $2.00. Competition between these and lines of woolens is naturally severe.

* * *

Women's Wear Openings: The showing of spring women's wear by one prominent organization brought forth much interest but only cautious buying. This attitude was expected and on the whole the reception is better than anticipated. It is reported that Dept. 4 of the American Woolen Co. will open spring lines on Tuesday, Sept. 25. Other lines will be shown during the course of October as there seems little reason for hurried action on the part of sellers. Efforts are being made to reestablish a broader market for fancies in the women's wear field and some results are expected to be evident next spring. The accepted staples will of course be continued, but there seems no hurry to open them as buyers know what they are, and the opening would merely amount to setting prices for the new season.

* * *

Women's Fabrics for Fall: Already the alleged low stocks of distributors are said to be making themselves felt in more persistent inquiry for spot goods. This call has since the Jewish holiday spread out to cover a variety of fancy coatings in addition to the more staple broadcloths, suedes, etc., which have been in constant movement. Some merchants are more hopeful now than for some time that spot activities will become really brisk and will encourage more interest in buying new spring lines for future delivery.

* * *

Men's Wear Styles: Among the outstanding fabrics for spring are sharkskins and shadow stripes. Buyers have disclosed fondness for these goods and sellers were fairly well prepared with variations of each. The sharkskin movement has taken on considerable proportions and it promises to offer a basis for further variation as the season progresses. Whether supplementary lines should be offered is a moot point in the market, but doubtless many houses will offer them. Temptation is strongest with those houses which did not exactly make the bull's eye with their first showing. They can act on what they have since learned of the market and perhaps in addition give the buyer some new variation which will attract him later in the season when he is looking for materials with which to sweeten his line.

Sale of Texas Fall Mohair Beginning

UVALDE, TEX.—The total accumulation of fall mohair here will approximate 1,500,000 lbs., according to L. G. Nunn, manager of a local warehouse. The clip is now coming in rapidly. It is said to be of a high quality and heavy.

The only sale so far reported was of 7,000 lbs., which brought 60c a pound. The spring clip here sold for 76⅛c a pound for kid hair and 86⅛c for grown hair.

Cottons Make Progress Anyway

Business Improves Despite Weakness in Raw Material

EVEN without the support of firm raw cotton, the cotton goods market has made encouraging progress during the last week. The recession of the staple to new low ground for the movement has not deeply unsettled the confidence of fabric users. Nearly all lines which have been readjusted to a lower basis, such as gray goods, denims, tickings, chambrays, khakis, etc., have proved ready sellers. It is apparent that buyers feel that the bottom of the market is near, if not already reached, for they have operated heavily on a declining gray goods market contrary to their usual habits when prices take a downward course.

At the present time the volume of cotton goods which may go into consumption seems usually sensitive to a narrow range of price. For example 19 to 20c cotton repelled buyers of goods and business lagged, while 17 to 18c cotton has proved attractive enough a basis to bring out considerable business for the last quarter of the year. Many authorities regard 17c as too low if the crop is to be only 14½ million bales. The factor of world consumption is however to be taken into consideration. If curtailment outside of the United States is proportionately greater than that within the United States, domestic mills will get their cotton on a basis which will appear attractive to them and their customers at least for a time.

On the basis of what has already been done it seems probable that the latter half of the year will show up better in the cotton goods industry than the first half. Mills have accumulated better forward orders during the last few weeks than they have had on their books for some time. Some gray goods lines have been heavily bought at low figures, and some lines of colored goods are nearing the sold up state. In that part of the field where trade is not so brisk, as for example with cotton duck mills, there is carefully maintained curtailment which will probably carry these branches of the business through their difficulties with the minimum of hardship. If cotton remains stabilized not far from 18c, it is the trade expectation that a real step up from the bottom of the depression will have been taken.

* * *

Cotton Blankets: Recent reports indicate that the current fall is considerably behind the excellent record made in this branch of the field last year. Except for certain lines which have a particular hold on the market, first hands are said to be accumulating stocks. It is understood however that distributors have fairly well liquidated their stocks, so that decks are clear for action during the next few weeks which may considerably clear up the situation.

* * *

Chambrays: Price readjustments on numerous lines of chambrays have been announced. The Consolidated Selling Corp. has reduced prices on Pilot Senior and Pilot Junior 36 inch chambrays about 1½c per yard. The Riverside & Dan River Cotton Mills have readjusted prices on their chambray lines, as have also the Hunter Mfg. & Commission Co. Although business in chambrays was reported fairly good toward the close of August, there is diverse opinion as to how the market as a whole stands. It is apparently true that conditions are spotty.

* * *

Denims: The 17c basis on denims continues to meet the approval of overall manufacturers, to whom it offers a better margin of profit than they have had for a number of months. It is understood that several organizations are already well sold for the remaining months of the year.

* * *

Wash Goods: After a period of sampling on wash goods for the spring 1929 season, there is said to be more doing in the nature of actual orders. Printed effects are popular and rayon constructions bid fair to hold their popularity. In some cases better progress in all-rayon goods may be made this season than was made last.

* * *

Print Cloths: Users of print cloths have been active buyers of 64x60s at 7¼s. If cotton strengthens as the week progresses that figure will probably give place to 7⅜c before the

Cotton Goods Quotations

	Sept. 19	Sept. 12	Sept. 21, 1927
Spot cotton, N. Y....	17.95¢	18.30¢	21.00¢
Print Cloths			
27- in., 64x60, 7.60..	5⅝-6¼¢	5⅝-6¼¢	6½¢
38½-in., 64x60, 5.35..	7¼-8¢	7¼-8¼¢	8⅝-9¢
39- in., 68x72, 4.75..	8½-8¾¢	8½-8¾¢	9⅞-10¢
39- in., 72x76, 4.25..	9¼¢	9⅝¢	11¼¢
39- in., 80x80, 4.00..	10¼-10⅝¢	10¼-10⅝¢	11½-12¢
Brown Sheetings			
36- in., 56x60, 4.00..	8⅝-8¾¢	8¾¢	11-11½¢
36- in., 48x48, 3.00..	10¼¢	10¼-10½¢	12¼-13¢
37- in., 48x48, 4.00..	8⅛¢	8¼¢	9¼-10¢
Pajama Checks			
36½-in., 72x80, 4.70..	8½¢	8¼¢	9⅝-10¢
36½-in., 64x60, 5.75..	7⅛-7¼¢	7⅛-7¼¢	8¢
Miscellaneous			
Drills, 37-in., 3yd.....	10¾-11¢	11¢	12¾¢
Denims, 2.20s.....	17¢	17¢	19¢
Tickings, 8 oz.....	21-22½¢	22-23½¢	24-24½¢
Standard prints.....	9¢	9¢	8¾¢
Eastern staple gingham, 27-in.....	10½¢	10½¢	10¢

Speed When You Need It---Quality Production Always---
The Machines Confirm It

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Lieberknecht
Full-Fashioned
Hosiery Machines
also
The Einsiedel
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In Any Desirable Gauge and Number of Sections.

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Lieberknechts Have Been Building Hosiery Machines For Over Fifty Years

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CONSTANT, trouble-free production — better work and economical operation are all featured in dependable Fletcher Extractors.

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Equip your Full-Fashioned Hosiery Machines with *Scherf Needles* and you will find that they are the *best Needles made.*

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The Demand Increases by Reason of Present-Day Industrial Organization and This Era of Novelty in Color and Structure.

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DAY SCHOOL
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Established 1874 Manufacturers of all kinds of

Spring Knitting Needles

Slides, Sinkers, Jacks, Etc.
New Brunswick, N. J.

Fabrics—Continued

week closes. At mid-week it was already hard to place orders at a quarter, and traders said that the advance will doubtless be made if cotton does not show a return of weakness. In the same way 68x72s were free sellers at 8½c, but that price is giving way to 8⅝c.

Burlaps Firmer

More Business and Slight Gains All Along the Line

Firmer prices came into effect early this week on nearly all positions in the burlap market, and a moderate amount of trading in future shipments was done. Some spots were moved and a few nearby goods sold. Far afloats continued nominal in quotation with little interest.

Calcutta cables showed an advance on the bazaar, and prices, especially on heavies, were advanced. The trade was awaiting the final Indian Government jute forecast.

Spot and afloat 8 oz. 40s were quoted at 7.35c, Sept. shipments from Calcutta were at 7.25 to 7.30c; Oct., 7.30c; Nov.-Dec., 7.25c; Jan.-Mch., 7.25c. Spot and afloat 10½ oz. 40s were quoted at 10.15c; Sept. shipments were at 9.85c; Oct., 9.60c; Nov.-Dec., 9.25c; Jan.-Mch., 9.15c.

Quiet in Silks Depressing

Satins Show Weakness — New Novelties Are Now Best Sellers

DURING the last week prices on satins have eased, due to the demand slacking off for this fabric. With the resultant overproduction caused by this lost interest in satins, prices are bound to suffer and just how far manufacturers will go in cutting prices in an effort to regain some measure of this business will be seen in the next week or two.

It was also stated by leading factors in the silk industry that the demand had fallen off considerably for all classes of silks for immediate delivery with the possible exception of interest still existing in novelty fabrics.

For some weeks this trend toward novelties has colored the bulk of business placed and several of the leading houses are adding new fabrics to their lines for advanced winter sale.

Outstanding among these is a warp printed taffeta produced in a range of twelve designs and five color combinations to each design.

Attractive color schemes worked into large and small flower and geometric patterns are unusually attractive when printed on the warp and give a subtle and hazy effect to the fabric.

Without doubt color is becoming more important constantly. Not haphazardly chosen, but with discrimination of high fashion, colors, especially for evening wear, are clearer than in recent seasons. The best evening colors seem to be lavendars, greens, yellows and blues and the red vogue continues to develop at fashion sources; bright red appearing in practically every collection at the recent Paris openings. As usual, in the development of a color trend the movement affects other colors. For instance, the rust beiges now appear with a redder cast and touches of red are used in combination with other colors.

The most important factor of color determination at this time and for the coming season, is the vogue for sun tanned complexions which are accepted more and more as being extremely smart. The coming Palm Beach season will undoubtedly see the vogue reach greater heights and costume colors will be popular with women only when they harmonize with a golden tan complexion. This unquestionably accounts for the clearer, brighter quality of the new fashion colors.

* * *

Velvets: These fabrics are in about the same position as last noted with almost no call for the regular type, but transparent numbers are well sold up.

* * *

Satins: Satins have fallen off considerably and prices are much lower in many cases.

* * *

Crepes, Voiles and Georgettes: These fabrics have met almost no call as yet this season and manufacturers say that interest in these goods for use in evening gowns is slower than past years in being evidenced.

* * *

Ribbons: Ribbons have gained 100% in the last month and it is stated that some manufacturers are now unable to deliver in any real quantity as they had been skeptical about manufacturing during such a weak market as they have experienced for a long time. Large sales in hair bows have helped to revive the market, and plaids, Roman stripes and moires in 2½ to 3-inch and even in 4 and 5-inch goods are selling well.

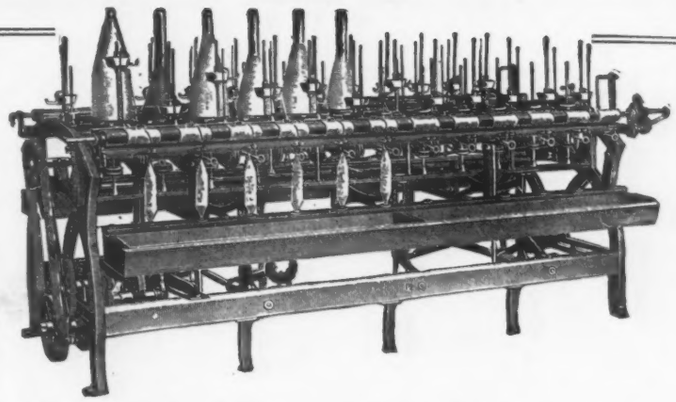
* * *

Silk Situation at a Glance: PRODUCTION—Overproduction in satins caused by lack of interest.

DEMAND—Generally poor at present for almost any type of fabric.

STOCKS—Possibility of large stocks forming if interest is not revived in satins.

SENTIMENT—No wide-spread interest in present market, and prices on some lines are weakening.



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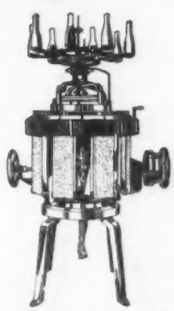

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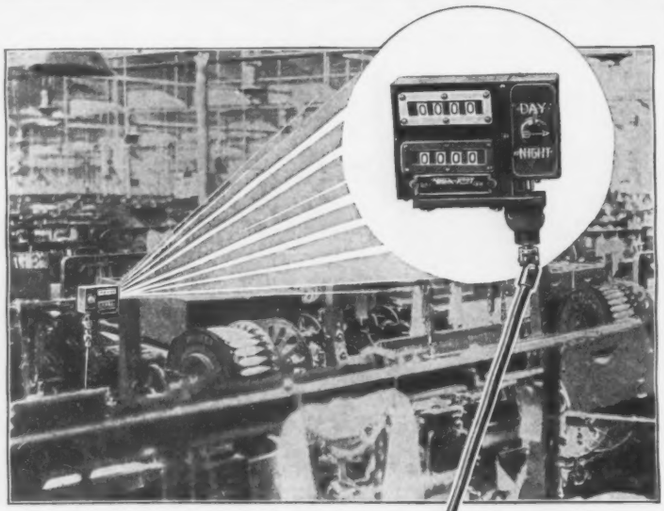

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Spotlights the Running-Time and the *Wasted* Time

A VEEDER-ROOT Pick Counter will focus attention on the actual running-time of a loom, as shown by its record of picks. It will total the picks woven daily or hourly, to compare with the number you *ought* to get with the loom making a good average running-time.

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Veeder-Root Textile Counters can be applied to every machine and work-situation in a mill. Write for Booklet T-1, or ask to *try one* of the Counters.

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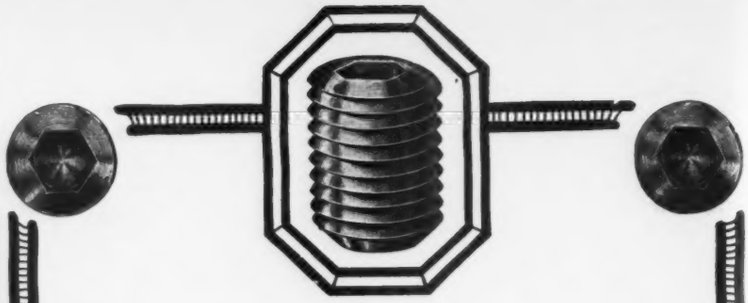

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When you need Hollow Screws in a hurry, you are surer of getting "ALLENS" than any others. Good Jobbers in every locality *have* them.

This Jobber-favor the country over means well-kept stocks to give you quick service. Means short-notice deliveries for emergencies.

There is one main reason *why* Jobbers prefer to supply you with ALLEN screws. Because your Jobber's success depends on yours. On the progress of business in his local territory.

And he knows that mills using ALLEN screws have fewer machinery tie-ups, lower maintenance costs and, other things being equal, better profits on manufacturing.

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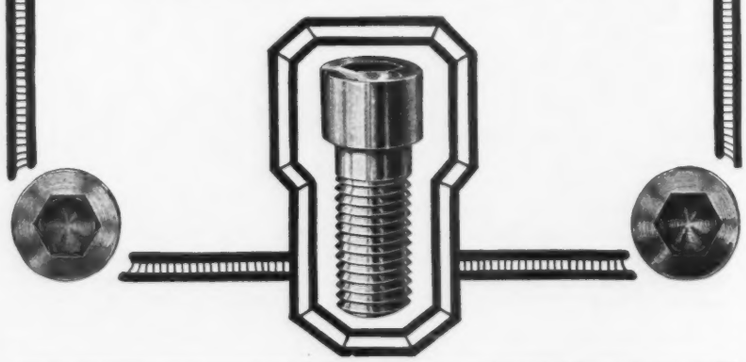
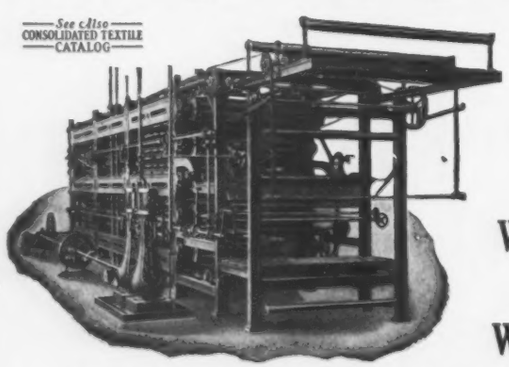


Tentering and Drying Machines

See also CONSOLIDATED TEXTILE CATALOG



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TENTERING AND DRYING MACHINES

For Woolens, Worsteds, Felts, Etc.

UPRIGHT—HORIZONTAL

See also CONSOLIDATED TEXTILE CATALOG TWENTIETH CENTURY

FINANCIAL

New Low Mark for Southern Shares Average

GASTONIA, S. C., SEPT. 15.—According to figures released today by R. S. Dickson & Co., the average bid price for 25 of the most active southern cotton mill stocks reached a new low mark of 103.20, compared with 104.12 for the previous week, a decline of 92c per share.

Sales for the week were again light. Buyers were attracted only when prices were named at materially reduced quotations. Since the second week in June there has been a decline in a number of stocks ranging as much as $12 to $15 per share.

New Bedford Mill Dividends Are Lowest on Record

NEW BEDFORD, MASS.—The amount distributed in dividends for the third quarter, for 28 New Bedford cotton manufacturing corporations was $257,770. Basing these returns on a capital of $57,211,900, which does not include the Fairhaven and Manomet mills now being liquidated, the average return for the third quarter is 45c, or about one-half of the rate for the first quarter of the year. The rate for the year will be slightly in excess of $2, based on the returns for the present quarter, an amount that compares poorly with the mean average of better than $11 for the 10 years previous to 1928.

It is hardly necessary to add that the rate for the third quarter, is the smallest in the history of the textile industry in this city, as will be the rate for the year. These figures bear mute testimony to the manner in which stockholders have suffered as a result of the depression in the industry and the textile strike that has closed 26 corporations controlling 56 mills for the last 22 weeks.

The rates and amounts paid for the third quarter:

Mill	Capital	Rate	Amount Paid
Acushnet	$2,000,000	...	.....
Beacon pfd....	1,283,000	1½	$19,245
Booth com...	852,800	...	.....
Booth pfd ..	344,100	...	.....
Bristol	1,000,000	...	.....
Butler	2,300,000	...	.....
City	750,000	...	.....
Dartmouth com	3,600,000	1½	54,000
Dartmouth pfd	600,000	1¼	7,500
Gosnold com..	1,650,000	...	.....
Gosnold pfd..	1,650,000	...	.....
Grinnell	1,500,000	...	.....
Hathaway	1,600,000	...	.....
Holmes com...	600,000	...	.....
Holmes pfd...	600,000	...	.....
Kilburn	2,250,000	1	22,500
Nashawena ..	7,500,000	...	.....
Neild	1,200,000	2	24,000
N. B. Cotton pfd	750,000	1½	11,250
Nonquitt	4,800,000	...	.....
Pierce Mfg....	600,000	...	.....
Potomska	1,800,000	...	.....
Quissett com..	2,000,000	2	40,000
Quissett pfd..	305,000	A 1½	4,575
Sharp com....	2,656,000	...	.....
Sharp pfd....	1,161,000	...	.....
Soule	1,260,000	2	25,200
Taber	1,600,000	...	.....
Wamsutta	6,000,000	...	.....
Whitman	3,000,000	...	.....
	$57,211,900		$257,770

A—Half of semi-annual dividend.

Fall River Merger Approaching

Homer Loring Refuses to Comment—Liquidating Dividends of New England Mills

BOSTON, SEPT. 19.

ACCORDING to rumors emanating from Fall River, New York and elsewhere the plans by which Homer Loring, the Boston banker who staged a comeback for the Boston & Maine R. R., is expected to salvage between one and two dozen Fall River print cloth mills, are nearing a stage where it will be difficult for Mr. Loring and his lieutenants to refrain from a certain amount of publicity regarding their objectives and accomplishments. At the present writing they are, as heretofore, saying nothing and presumably "sawing wood."

Among recent happenings that are shrouded in more or less mystery and that are believed by some to be connected with Mr. Loring's Fall River plans are the offer made recently for King Philip stock and the report that negotiations are under way for the purchase or control of Cohn-Hall-Marx Co., New York converters. The offer for King Philip stock at $175 a share came through an official of the First National Bank of Boston, and its identification with a possible Loring merger is believed to be based upon the desire of Mr. Loring to diversify and "sweeten up" such a combination. It is natural to suppose that such a complete combination will require skilled merchandising, therefore, the identification of the offer for the Cohn-Hall-Marx Co. No one identified with either corporation admits knowledge of the identity of the possible purchaser. Possibly the next development will be a rumor of an offer having been made for one of the finishing plants not far distant from Fall River.

That the recent merger of Fall River banks was the first step taken by Mr. Loring in his rehabilitation program was freely acknowledged, and this week J. Edward Newton, treasurer of the Barnard Mfg. Co. and former treasurer of the Troy Cotton & Woolen Manufactory and the Arkwright Mills, directs a circular letter to Troy stockholders which is prefaced by the statement that he was forced by the banks of Fall River to resign as treasurer of the Troy Cotton & Woolen Manufactory and warning stockholders that liquidation of several Fall River mills may be of forced character and advising stockholders to get together for conservation of their interests and for possibly independent consolidation. Mr. Newton favors consolidation and his letter is interpreted as being in opposition to the Loring plan. There appears to be an assumption in Mr. Newton's letter that many Fall River Mills, now appearing to be facing liquidation, may escape it by cooperation of stockholders in affecting a consolidation of their own.

Profits in Converting

Of all of the various rumors that appear to indicate approaching publicity for portions of the Loring plan for rehabilitating Fall River Mills perhaps none is more interesting than that identifying the Cohn-Hall-Marx Co. with the merger. This converting house is one of the largest and most successful in the country. Its financial statement for the fiscal year ended July 31 has just been published and shows net profits of $687,573 after all charges. After payment of preferred dividends a balance of $647,831 was earned on the common stock, which is equal to $6.47 a share on the 100,000 shares outstanding. For the 1927 fiscal year the net profit was $467,334, and after all deductions including preferred dividends there was a balance of $420,959 for the common stock, equal to $.20 a share. The condensed balance sheet of the company for the last two years ended July 31 is as follows:

ASSETS	July 31 1928	July 31 1927
Cash	$256,058	$267,543
*Accts. receivable.	2,635,217	2,131,249
Notes receivable, etc.	60,110	38,724
Life insurance....	29,285	18,643
Inventory	3,337,098	2,484,547
Current assets....	$6,317,771	$4,940,707
Barbe - McKenzie Corp. investment	292,960	292,960
Miscellaneous	9,061	2,320
Deferred charges..	52,416	40,928
†Fixed assets.....	81,659	93,545
Total	$6,753,868	$5,370,462
LIABILITIES		
Notes payable.....	$2,600,000	$1,960,000
Accounts payable..	385,383	207,451
Due employes.....	86,966	66,332
Tax reserve.....	100,361	74,552
Current liabilities.	$3,172,711	$2,308,336
**Preferred stock..	526,900	655,700
***Common stock.	1,000,000	1,000,000
Surplus	2,054,257	1,406,425
Foreign drafts....	339,035	167,268
Letters of credit..	19,605	161,503
Total	$6,753,868	$5,370,462

* Less reserve for discounts. † Less reserve for depreciation. ** Represented by 5,600 shares ($100 par) in 1928, less 191 shares in treasury, and 6,672 shares in 1927, less 115 in treasury. *** Represented by 100,000 shares.

Liquidation Dividends

Of several New England cotton mills that are in the process of liquidation the Lyman, Salmon Falls and Everett have paid additional dividends. The Lyman dividend of $25 a share payable September 20 brings total payments of that corporation in liquidation to $215 a share. The Everett Mills dividend of $10 a share payable September 27 is an initial disbursement, and while more will be paid later the amount is at present somewhat problematical. The balance sheet of the Salmon Falls Mfg. Co. recently filed with the Massachusetts Commissioner of Corporations shows that that company had paid in liquidation up to June 30 last a total of $525,057, equal to $39 a share. It had cash, investments and other assets on June 30 equivalent to $4.86 a share.

N. E. Southern Reorganization

At a meeting held this week stockholders of the New England Southern Mills approved a reorganization plan proposed by the directors whereby mills at La Grange and Hogansville, Ga., Lowell, Mass., and Lisbon, Me., have been or will be sold. In addition they approved the following capital readjustments: Bank loans of $3,500,000 and $3,244,000 of 7% notes due 1929 will be exchanged, on the basis of each $1,000, for $150 in cash and interest adjustment, $350 in new 5% notes due in 1933, and 5 shares of new $7 prior preferred. The present $4,000,000 issue of preferred will be exchanged share for share for $7 preferred. The present $5,000,000 issue of preferred will be exchanged share for share for new common. Each 100 shares of the present issue of 203,042 common shares will be given one share of new common. Each share of the present $3,000,000 issue of preferred of the Stark Mills subsidiary will be given three-quarters of a share of new preferred and one-quarter share of new common stock of New England Southern Mills.

Boston Stock Auctions

The following sales of textile shares were made at Wednesday's auctions:

Shrs.	Mill	Par	Price	Change
8	Pepperell	100	94¼–95	+¾
25	Farr Alpaca	100	110¾	—¼
3	Great Falls.....	100	98	+2⅛
5	Otis	100	45	+6½
305	U. S. Worsted, 1st pfd.	100	80c–96c	—5c
50	U. S. Worsted, com.....	...	15c	+1c
30	Lancaster, pfd.....	100	13⅛	—¼
50	Dwight	25	12½	+1⅜
25	Boston Mfg., pfd.....	100	21	—4½
10	United Elastic.....	100	45	+1¾
100	Plymouth Cordage.....	100	71½	—¾
30	Sharp, com.....	100	21c	+7c
226	Parker Mills, com.....	100	5⅝	+1⅜
64	Parker Mills, pfd.....	100	26½	.....
11	B. B. & R. Knight pfd. vtc.	100	103¾	—1¼
5	Hill	100	22	—1
20	Naumkeag	100	138	—1
10	Ludlow	...	205	+4⅞
100	Nashua, com.....	100	42½	+3¾
20	Arlington	100	36⅜	.....
10	Quissett, com.....	100	82	—12

1137 Total.

Fall River Stocks Are a Shade Firmer

FALL RIVER, MASS.—The demand for local mill stocks this week was confined to only a few issues, but was sufficiently strong to result in an advance in bids for those sought, together with a corresponding advance

Sews *heavy* goods

Designed by the head finisher of a large New England woolen mill, the Dinsmore Improved Gear-type Rotary Machine has met with marked success.

It has proved a practical and effective machine for sewing heavy cotton and woolen goods, cotton ducks, woolen and cotton blankets, artificial leather, etc.

This heavy duty machine is operated by foot power and sews any fabric, thick or thin, wet or dry. It is simply and carefully constructed, the gears being accurately machined. A noteworthy feature is the very heavy base permitting of easy moving from place to place without danger of tipping over. Our line is most extensive. A catalog is yours upon request.

DINSMORE MFG. CO.
Salem, Mass.

See also CONSOLIDATED TEXTILE CATALOG

Rome, Georgia

Hydro Electric Power 1c KWH

Open shop town, never any labor trouble, population 99½% native born, 82% white. Wonderfully healthy location in the hills of North Georgia. Served by several rivers, exceptionally fine water and invigorating climate — no lost time from inclement weather. Especially adapted to small manufacturers using Rayon or other textiles. Over 70 different manufacturers, making 150 different products. Paper and wood box factories facilitate crating needs. Three trunk railroads provide ample shipping facilities.

Rome was chosen by the American Chatillon Corporation (the 10 million dollar Rayon plant now in construction) in preference to all other locations. Inquire for information.

ROME CHAMBER OF COMMERCE
"The Live Wires Down in Dixie"

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Special Attention to Textile Inventions

Financial—Continued

in asking prices. The bid for Davol has advanced from 11 to 12, for Flint from 52 to 54, for King Philip from 164 to 166 for Stevens from 88 to 92, and for Union from 55 to 57½. Asking prices for same issues showed an advance of from one to five points. The few available shares of Davis mills have been taken out of the market at from 41 to 42, and a few shares of King Philip are reported to have sold at from 164 to 168.

No further information has leaked out concerning the tentative offer of 175 per share for the capital stock of the King Philip mills nor is any expected pending the completion of the appraisal of the mills' assets which is being made by auditors in the interest of those who submitted the offer. It is believed that the appraisal will be completed the present week.

New England Textile Stocks

(Quotations at "Public Sale" are based upon last sales at Boston Public auction and Boston Stock Exchange. Bid and Asked prices are latest quotations of leading Boston dealers.)

	Public Sale	Bid	Asked
Am. Mfg., pfd.	61¼	59	64
Am. Wool, pfd.	46	...	...
Amoskeag	19	...	...
Androscoggin	70¼	60	70
Arlington	36⅛	35	37
Bates	140	138	140
Berkshire Cot.	124¼	107	...
Bigelow-Hfd. com.	88	...	...
Boott	128½	125	130
Edwards	70	80	...
Esmond, pfd.	101	100	103
Farr Alpaca	110¾	110	114
Great Falls	9⅜	5	8
Hamilton Woolen	19½	18	21
Hill	22	22	27
Ipswich, pfd.	5	7	...
Ipswich, com.	2½	...	3
Lawrence	67⅛	67	69
Ludlow Asso.	205	204	210
Merrimack, com.	135⅞	158	...
Nashua, com.	40½	37	40
Nashua, pfd.	83	82	85
Naumkeag	139	140	145
N. E. So., pfd.	2	...	...
Otis	4	38	40
Pacific	27½	...	...
Pepperell	95	92	95
Plymouth Cordage	71⅛	72	77
York	19¼	19	22

N. Carolina Textile Stocks

(Taken from list of Southern Mill Stocks quoted by R. S. Dickson & Co., Gastonia N. C.)

	Bid	Asked
Acme Spinning Co.	106	...
Am. Yarn & Processing Co.	98	101
Arlington Cotton Mills	...	90
Arrow Mills	...	90
Chadwick-Hoskins Co. (par $25)	10	14
Chadwick-Hoskins Co., 8% pfd.	102½	104½
China Grove Cotton Mills	110	118
Clara Mfg. Co.	72	83
Climax Spinning Co.	98	106
Clover Mills	...	62
Crescent Spinning Co.	85	95
Dixon Mills	100	110
Durham Hosiery, 7% pfd.	...	36
Durham Hosiery "B"	...	6
Eastern Mfg. Co.	...	51
Erwin Cotton Mills Co.	114	...
Erwin Cotton Mills Co. 6% pfd.	103	106
Globe Yarn Mills (N. C.)	48	55
Gray Mfg. Co.	...	80
Hanes, P. H., Knitting Co.	14	18
Hanes, P. H., Ktg Co., 7% pfd.	102	...
Henrietta, 7% pfd.	74	81
Imperial Yarn Mills	...	78
Jennings Cotton Mills	195	210
Linford Mills	100	106
Locke Cotton Mills Co.	...	106
Lola Mfg. Co.	...	55
Majestic Mfg. Co.	160	...
Mansfield Mills	110	117
Mooresville Cotton Mills	...	20
Mooresville Cotton Mills 7% pfd.	...	90
Myers Mill	75	...
National Yarn Mill	...	91
Parkdale Mills	...	70
Perfection Spinning Co.	93	100
Ranlo Mfg. Co.	130	146
Rhyne Houser Mfg. Co.	99	105
Roanoke Mills, 7½%, 1st pfd.	95	99
Roanoke Mills, 8%, 2nd pfd.	90	97
Rosemary, 7½%, pfd.	98	...
Rowan Cotton Mills Co.	86	95
Seminole Cotton Mills Co.	...	94
Sterling Spinning Co.	99	105
Stowe Spinning Co.	99	103
Victory Yarn Mills Co.	...	56
Winget Yarn Mills Co.	...	65
Wiscasset Mills Co.	205	...

Fall River Mills Stocks

(Quotations furnished by G. M. Hafford & Co.)

	Bid	Asked
Algonquin Printing Co.	310	...
Arkwright Mills	...	10
Barnard Mfg. Co.	...	20
Borden Mfg. Co., Richard	10	...
Border City Mfg. Co.	...	12
Bourne Mills Co.	40	48
Chace Mills	2	...
Charlton Mills	...	97
Cornell Mills	...	30
Davis Mills	...	42
Davol Mills	10	...
Flint Mills	50	...
Granite Mills (com.)	...	18
Granite Mills (pfd.)	...	...
King Philip Mills	163	...
Laurel Lake Mills (com.)	...	10
Laurel Lake Mills (pfd.)	...	...
Lincoln Mfg. Co.	35	38
Luther Mfg. Co.	...	112
Merchants Mfg. Co.	23	...
Narragansett Mills	...	30
Osborn Mills (new)	75c	...
Parker Mills (com.)	5	...
Parker Mills (pfd.)	25	...
Pilgrim Mills	...	135
Sagamore Mfg. Co.	...	90
Shove Mills	...	12
Stafford Mills	...	10
Stevens Mfg. Co.	87	...
Union Cotton Mfg. Co.	59	...
Wampanoag Mills	...	20
Weetamoe Mills	...	2

May Reopen Former Bragg Plant as Finishing Works

It is reported from Providence, R. I., that another attempt is to be made to operate the former plant of the Bragg Woolen Co. in the village of Tarkiln, R. I., lately occupied by the Columbia Fiber Corp. This is indicated by the incorporation of the Rosedale Finishing Works, a new corporation believed to be backed by some of the men who were connected with the Columbia corporation. The new concern, according to its articles of incorporation, will locate in Tarkiln and engage in the manufacture of textiles. Edward M. Brennan, William A. Graham, and John E. Canning, Providence attorneys, whose names appear as incorporators, claim to know nothing of the new venture beyond the scant information contained in the articles of incorporation which they filed at the State House in behalf of a New York client.

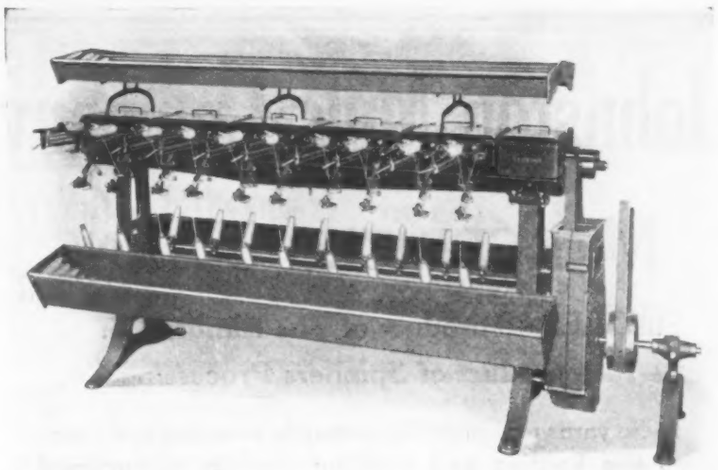
Federal Tax Lien Filed Against Weetamoe

FALL RIVER, MASS.—A Federal tax lien for additional income tax for 1918 has been filed against the Weetamoe mills in the sum of $95,544.39. Stock in process is being run out at the mill as the first step toward liquidation.

Merger of United Textiles and Field, French & Co.

CHICAGO, ILL.—The United Textiles Co. and Field, French & Co. have consolidated, it was announced here.

The new concern will operate under the name of the Field, French Co., at its headquarters in the Brooks building, with Judson L. Field, continuing as president.



Universal No. 90 Winder
with Over-end Attachment

Winding Filling for Weaving

THIS machine has enabled progressive mills to effect far-reaching economies, starting in the spinning and carrying through the weaving and cloth rooms. These economies are realized through discarding the old practice of spinning filling on small bobbins that could be placed directly in the shuttles, and by spinning to the maximum ring possible to the count of filling, and then winding from the large spun bobbin to a proper shuttle bobbin on the Universal No. 90 winder. These bobbins are wound firmly and to an exact size to fill the shuttle, presenting at least double the amount of filling per shuttle that was possible with the spun bobbin. The filling during the winding process is slubbed and cleaned, thereby giving an inspected filling.

To summarize: the use of this machine is directly responsible for increased production in spinning, increased production in weaving, and improved quality in cloth, with decreased costs. Filling may be wound to the dimensions given on automatic loom bobbins with proper bunches for feelers, on cone base bobbins, and in pin-cop form.

By coupling the underneath shafts, three or four machines may be driven as one unit by a belt or by direct motor drive.

UNIVERSAL WINDING COMPANY

PROVIDENCE CHICAGO, UTICA NEW YORK BOSTON MONTREAL AND HAMILTON, CANADA PHILADELPHIA CHARLOTTE ATLANTA

DEPOTS and OFFICES at MANCHESTER and PARIS

LEESONA

REG. U.S.A. AND OTHER PRINCIPAL COUNTRIES

Johnston Mills Company

"Direct to Consumer"

MERCERIZED YARNS

SINGLES — product of The Elmore Co.

PLY — product of Spinners Processing Co.

These yarns recognized for strength, evenness and lustre, possess knitting and finishing qualities unsurpassed. Complete warehouse stocks carried in leading Textile Centres for quick delivery.

COMBED AND CARDED YARNS

Full range of numbers produced by our own mills from that character of cotton, exactness of twist and count, excellence of workmanship and winding, that insure minimum trouble and maximum production for the knitter and weaver.

SALES OFFICES:

NEW YORK: 93 Worth St. PHILADELPHIA: Public Ledger Bldg.
CHATTANOOGA: 805 James Bldg. CHARLOTTE: Johnston Bldg.
CHICAGO: 688 Adams Franklin Bldg. READING, PA.: 207 Berk Co. Trust Bldg.

J. H. SEPARK
Secy. and Asst. Treas.

J. L. GRAY
Vice-Pres. and Gen. Mgr.

Arlington Cotton Mills
Parkdale Mills, Inc.
Arrow Mills, Inc.
Myrtle Mills, Inc.
Arkray Mills, Inc.
Gray Manufacturing Co.
Flint Manufacturing Co.
Gastonia, North Carolina

Spinners of Fine

Cotton Yarns

Gassed and Ungassed
Combed Peeler
Double Carded Peeler
in sizes
26s to 120s — single and ply for
CONVERTING—KNITTING—WEAVING and ELECTRICAL USAGE
and 24s to 100s—2, 3, and 4 ply for
THREAD PURPOSES

We are using weavers knots throughout our process of manufacture both in single and ply yarns.

H. A. Florsheim

General Sales Manager

225 Fifth Ave., New York City

Branches

Boston Gastonia Philadelphia Chicago

CONES *TUBES*

DIXIE MERCERIZING CO. — DIXIE — STRENGTH — QUALITY — LUSTRE — CHATTANOOGA, TENN.

COPS *SKEINS*

Natural, Dyed, Gassed, and Bleached

The Dixie Mercerizing Company's Trade Mark has come to represent the best in mercerized yarns to knitters and weavers everywhere — the result of consistent, year after year, production of strong, uniform, lustrous yarns.

DIXIE MERCERIZING CO.

SPINNERS AND PROCESSORS

CHATTANOOGA TENNESSEE

Full Fashioned Hosiery Problems *Solved*

Our special laboratory is solving the problems of other full fashioned hosiery manufacturers in Plaiting and Splicing Yarns. It can help you.
Special Full Fashioned Quality
90s/2—100s/2—120s/2
40s/1 to 100s/1

Mercerized—Natural or Tinted. Licensed for tinting under patent No. 1,496,696.

FORREST MERCERIZING CO.

Gloucester, N. J.

Sales Office

FORREST BROS.

119 So. 4th St., Forrest Bldg., Philadelphia, Pa.

Quick Service

Prompt Deliveries

(Reg. U. S. Pat. Off.)

COTTON YARNS

Cotton Baled to Be Shown at National Cotton Show

HENDERSON, N. C.—Four bales of cotton baled here, and shipped to Bremen, Germany and back, to test the durability of cotton bagging, will be a feature of the United States Department of Agriculture's exhibit at the National Cotton Show at Memphis, Tenn., Oct. 13-20.

After being baled at Henderson, the cotton was shipped to Norfolk, Va., over the Seabord Air Line, where it was compressed to high density, and was exported from there to Bremen.

After receiving the usual warehouse handling in the German city, it was returned to Philadelphia, handled in a warehouse, and finally sent to Memphis.

The bales were handled twice as much as is usually the case in foreign trade, but according to reports received here, the cotton bagging covering is in first class condition.

The Department's exhibit at Memphis, occupying more than 3,000 feet of floor space, will be devoted to the utilization of cotton fiber and seed, and will cover hundred's of manufactured commodities.

Lower Prices Attract Buyers

Mercerized Yarns Lowered— Single Combed in Demand

Philadelphia.

FURTHER weakness in cotton during the last two weeks caused a larger number of manufacturers to come into the yarn market, placing contracts to be delivered during the next two to three months. Manufacturers' ideas are low and such contracts have usually been under the prevailing level quoted by dealers, it being reported that fair sized sales of 20s-2 warps, ordinary grade, have been made at 33½c, which is half cent under the low range quoted by dealers and a cent and a half under figure named by spinners.

Freer buying during the last two weeks has resulted in a fair to large volume of business in single combed yarns used by knitting trades, several manufacturers buying yarns to be delivered the latter part of this or the early months of next year. Spinners state demand for single combed has been largely confined to coarser counts such as 18s and 20s and a number are not in position to make nearby deliveries of these counts for the next month or more. There has been keen competition among combed spinners for this business and while quotations of 39c for 18s are mentioned, buyers have been able to better this figure slightly in several instances.

Lower Mercerized Prices

Mercerizers have reduced prices from 1 to 4c, depending on the count and are now holding 60s-2 at 78c, a decline of 4c from the previous figure quoted. This reduction in processed yarns was made possible by weakness in two-ply combed which has continued easy during the last two months. The lowering of mercerized qualities brings them more in line with the present gray yarn price list and mercerizers are optimistic that lower prices will result in covering by manufacturers who have been postponing purchases waiting for this drop. Finer counts of mercerized are now quoted on the basis of $1.45 for 90s-2, $1.75 for 100s-2 and $2.15 for 120s-2.

Improvement in sales of mercerized as a result of this will aid combed yarns which have been dull for many months. A trend in this direction has already been noted although no arresting of the weakness of prices has occurred. Several dealers and spinners state they have sold more combed yarn so far this month than in the entire month of August. Combed qualities are selling at a low level based on long staple costs and there is little or no margin left, according to spinners, when sales are made on the current basis of 54c for 50s-2.

Dress Goods Mills Busier

In carded yarns one of the most favorable aspects of the situation is found in recent reports from manufacturers in this section who state they are receiving a larger volume of goods business than for a number of months, dress goods manufacturers specializing in cotton-worsted effects in particular booking a larger amount of business. Manufacturers are ready to buy fair sized quantities of carded yarns when they feel bargains are being obtained and several sales of this type have been reported by dealers.

Cotton Yarn Quotations

Carded—(Average Quality)

Double carded weav'g and knitt'g yarn 2c to 4c higher, according to quality

Single Skeins or Tubes—(Warp Twist)

4s to 8s	29½	—30	20s	33½	—34
10s	30	—30½	24s	—	—34½
12s	30½	—31	26s	—	—35½
14s	31	—31½	30s	—	—37½
16s	31½	—32½	40s	—	—44½

Two-Ply Skeins and Tubes

8s-2	30	—30½	26s-2	36½	—37
10s-2	—	—31	30s-2	37	—38
12s-2	31½	—32	36s-2	42	—43
14s-2	32½	—33	40s-2	44	—45
16s-2	—	—33½	40s-2 High Breakage	48	—49
20s-2	—	—34	50s-2	53	—54
24s-2	—	—36	60s-2	59	—61

Single Warps

10s	—	—31	24s	34	—36
12s	—	—31½	26s	35	—37
14s	—	—32	30s	37	—39
16s	—	—32½	40s	46	—47
20s	33	—34			

Two-Ply Warps

8s-2	—	—31	24s-2	36½	—37
10s-2	—	—32	26s-2	37	—38
12s-2	—	—32½	30s-2	38	—38½
14s-2	—	—33	40s ordinary	45	—46
16s-2	33½	—34	50s-2	54	—55
20s-2	34	—34½	60s-2	60	—61

8s-3 and 4-ply skeins and tubes: tinged, 27½-28½ white, 30

Hosiery Cones (Frame Spun)

8s	29	—29½	22s	32½	—33
10s	29½	—30	24s	33½	—34
12s	30	—30½	26s	34½	—35
14s	30½	—31	30s tying in	35½	—36
16s	31	—31½	30s regular	36½	—37
18s	31½	—32	30s extra quality	—	—38
20s	32	—32½	40s	43	—45

Combed Peeler—(Average Quality)

Warps, Skeins and Cones

20s-2	43	—44	50s-2	54	—56
30s-2	47	—48	60s-2	59	—62
36s-2	48	—50	70s-2	69	—74
40s-2	50	—52	80s-2	78	—85

Singles

12s	—	38	30s	46	—47
14s	—	—38½	38s	48	—49
16s	38½	—39	40s	49	—50
18s	39	—40	50s	54	—56
20s	40	—41	60s	59	—62
24s	42½	—43½	70s	70	—75
28s	45½	—46½	80s	78	—85

Mercerized Cones—(Combed, Ungassed)

26s-2	59	—60	80s-2	1 02	—1 65
30s-2	60	—61			
36s-2	63	—65	**Singles**		
40s-2	64	—66	**30s**	—	**—80**
45s-2	68	—70	**40s**	—	**—85**
50s-2	70	—73	**50s**	—	**—90**
60s-2	78	—81	**60s**	—	**—1 03**
70s-2	90	—93	70s	—	—1 03
			80s	—	—1 48

Peeler—(Super Quality)

Single Cones

	Carded		Combed			Carded		Combed	
10s	35	—36	42	—44	26s	40	—41	49	—52
14s	36	—37	43	—45	30s	42	—43	52	—55
16s	36½	—37½	44	—46	36s	45	—46	55	—60
18s	37	—38	45	—47	40s	47	—50	58	—63
20s	37½	—38½	46	—48	50s	—	—	64	—68
24s	39	—40	48	—50	60s	—	—	70	—75

Combed Cones, Warps and Tubes

20s-2	45	—50	40s-2	57	—60
24s-2	47	—52	50s-2	63	—70
28s-2	48	—53	60s-2	70	—75
30s-2	50	—55	70s-2	80	—85
36s-2	55	—58	80s-2	95	—1 00

Combed Reverse Twist Thread Yarns—Skeins, Tubes or Cones, 2, 3, and 4-ply

	Peeler		Sakelarides	
	Average	Best	Average	Best
24s	54—55	60—61	84	89
30s	57—58	63—64	87	92
36s	59—60	65—66	89	94
40s	64—65	69—70	93	98
45s	69—70	74—75	98	1 03
50s	74—75	79—80	1 03	1 08
60s	84—85	89—90	1 13	1 18

Quotations are average prices of the counts and qualities indicated at the close of business Sept 19. They do not cover lower or higher qualities unless specifically noted. For New York Spot cotton prices, see page 79. For staple cotton prices, see page 81.

ABERFOYLE MANUFACTURING COMPANY

MERCERIZED YARNS

MAIN OFFICE
Bankers Trust Building
PHILADELPHIA

Mangum Street
HIGH POINT, N. C.

116 Bedford St.
BOSTON, MASS.

418 Franklin St.
READING, PA.

James Building
CHATTANOOGA, TENN.

323 So. Franklin St.
CHICAGO, ILL.

122 East 7th St.
LOS ANGELES, CAL.

Westaway Building
HAMILTON, CANADA

MILLS
CHESTER, PA. BELMONT, N. C.

Cotton Yarns—Continued

with prices a half cent under the low range named by dealers.

Dealers find they are able to sell 20s-2 warps freely when 33½c is quoted and a small number have been reported as soliciting business at that figure for a fair grade yarn. One spinner was located this week willing to accept orders at 34c but a majority were asking 35c and holding firmly at that level. This is possible because they have a fair amount of orders on their books and because of the absence of stocks of this count here or in the South. Manufacturers are finding it necessary to wait for delivery from the spinner in most instances when this count is wanted.

There are only a few spinners willing to accept less than 35c for 20s-2 warps and from present indications it will not take a long time for these to book sufficient business to take them out of the market so far as deliveries during the next few weeks are concerned. As a majority of spinners already have enough business in this count to make it unnecessary for them to cut prices, many feel that the 34c warps will be a thing of the past within a short time unless additional weakness in cotton occurs. In the small number of instances where sales have been reported at less than 34c it is felt dealers were short-selling or direct-sellers were figuring on a 35c price less the usual 5% commission.

Carded Knitting Easier

Carded knitting yarns are slightly easier than a week ago, spinners now quoting ordinary grade yarn on the basis of 29½c for 10s or half cent lower than last week, while slightly better yarn, not extra-carded, is quoted at 30c. Although demand has not been active, houses specializing in high grade carded knitting yarns report a fair demand and booking of a number of medium sized contracts running as large as 50,000 lbs. Sales of 30s extra-carded have been made at 37c this week, although spinners are squoting a full cent higher as a rule. Activity in carded knitting has not been so noticeable as that in combed knitting qualities, the latter being moved in larger amounts than for a number of weeks.

Although the reverse is usually true, dealers are predicting that should cotton decline further a larger volume of yarn buying will occur. This is in contrast to the usual practice of manufacturers to buy after the low point has been reached and prices start to advance. It is based upon the premises that mills need additional yarn for use during the next two months and upon the assumption cotton and yarns are at cheap levels at the present time, larger interest from buyers during the last two weeks being evidence of this. Further decline would accelerate this movement of manufacturers.

Mercerized Yarns Reduced by Aberfoyle

PHILADELPHIA.—On Sept. 14 the Aberfoyle Mfg. Co., announced mercerized yarn prices had been changed, lower figures being effective Sept. 17. New prices represent reductions of from one to four cents depending on the count. Prices named by this concern are as follows:

20s-2	$.57
24s-2	.58
26s-2	.59
28s-2	.59½
30s-2	.60
36s-2	.63
40s-2	.64
50s-2	.70
60s-2	.78
70s-2	.90
80s-2	1.02
90s-2	1.45
100s-2	1.75
120s-2	2.15

Cotton Yarns Decline on Chattanooga Market

CHATTANOOGA, TENN.—Declines in the price of both carded and combed yarns and announcement of a reduction in the price of two-ply mercerized yarns effective Sept. 17, featured the local yarn market during the period ending Sept. 15. The announcement of a reduction in the mercerized prices was made by the sales department of a local mercerizing company.

The reduction in carded cones amounted to a flat sum of about 1c a pound. Combed singles dropped 1 to 3c and two-ply mercerized prices effective Sept. 17, showed reductions of 1 to 4c.

While cotton yarn prices were wilting silk was gaining ground. As the week closed double extra in thrown silk was quoted at $5.65. This is an advance of 10c for the week. The price changes did not seem to encourage buying for there was very little business booked, a local broker reports.

A leading cotton yarn man here is quoting 10s in carded cones at 30 to 31c with 20s at 33 to 34c. New mercerized prices show 20s-2 off 1c at the new figure of 57c; 60s-2, 70s-2 and 80s-2 each dropped 4c a pound, the new prices being 78c, 90c, and $1.02. Combed singles are now at 40 to 41c for 18s and 70 to 71c for the 70s.

Standard - Coosa - Thatcher to Change Capital Structure

CHATTANOOGA, TENN. — Stockholders of the Standard-Coosa-Thatcher Co., have been called to meet in special session here Sept. 26 to consider and act upon a proposed change in the capital structure of the company.

It is proposed to change the par value of the common stock from $100 a share to $25 a share. The stock is estimated to be worth approximately $164 a share at present.

The notice just sent to stockholders states that the change is pursuant to a resolution adopted at a previous meeting of the board of directors, and after the change the company would have 200,000 shares of common stock

GROVES MILLS, Inc.
SUPER QUALITY
COTTON YARNS
COMBED PEELER, 24s to 80s, single and plies
CONES, TUBES, SKEINS AND WARPS
Samples and quotations promptly furnished.
SALES OFFICE:
225 FIFTH AVENUE, NEW YORK
MILLS AT GASTONIA, N. C.

SWIFT SPINNING MILLS
Columbus, Georgia
Cotton Yarns of Quality
From Mill direct to Consumer
WM. A. P. MACKNIGHT
Sole Representative
1518 Walnut St. Philadelphia, Pa.

ROCKFISH MILLS, Inc.
DIRECT SELLING SPINNERS
COTTON YARNS OF QUALITY
10's to 40's Single and Ply
Warps, Skeins, Tubes, Cones.
Selling Offices
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NEW YORK 456 Fourth Ave. Ashland, 4342
PROVIDENCE, R. I. 36 Exchange Place Gaspee 2218

JAMES E. MITCHELL COMPANY
Cotton and Rayon
YARNS
Philadelphia Boston

FORREST BROTHERS
Forrest Bldg., 119 S. Fourth St., Phila., Pa.
Superior Quality Knitting Yarns
Sole Representatives
Bladenboro Cotton Mills—Vass Cotton Mills
8s to 30s Extra Carded

TILLINGHAST-STILES CO.
COTTON YARNS
PROVIDENCE, R. I.
113 Worth St., New York
Room 922, Utilities Bldg., 327 So. LaSalle St., Chicago

H.S.RICH & CO.
COTTON YARNS
180-182 SOUTH WATER ST
PROVIDENCE, R.I.

COTTON PRODUCTS COMPANY

Bankers Trust Building, Philadelphia, Pa.

Sole Selling Agents

for

ROWAN COTTON MILLS CO.
Salisbury, N. C.
Combed Peeler Yarns
24's to 40's

A. M. SMYRE MFG. CO.
Gastonia, N. C.
Combed Peeler Yarns
50's to 80's

SOUTHERN MERCERIZING CO.
Tryon, N. C.
Single Mercerized Yarns

WATERMAN, CURRIER & CO., INC.

78 CHAUNCY STREET
BOSTON, MASSACHUSETTS

NEW YORK 40 Worth St. | PHILADELPHIA 1600 Arch St. | CHARLOTTE Commercial Bank Bldg.

Selling Agents for

Avondale Mills **Cowikee Mills**

High Grade Carded Cotton Yarns

Fitchburg Yarn Company

Fine Cotton Yarns especially suited to the requirements of Silk Manufacturers, spun from combed American and Sakelarides Cotton

30's to 120's, Cops, Cones, Tubes, Skeins, Warps, Beams in Single and Ply

American Yarn & Processing Co.

Single and Ply Mercerized Yarns
Gassed or Dyed

In All Standard Counts and Put-Ups

Henderson - Harriet Cotton Mills

HENDERSON, N. C.

QUALITY GREATLY IMPROVED

New Card Room Equipment of the latest type

6s to 20s single slow carded — Cones & Skeins
8s to 16s plied — Cones, Skeins, Tubes & Warps
22s to 30s single — Cones & Skeins

Direct Representation

SELLING OFFICES

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New York City 17 E. 42nd St. *Murray Hill 0614*
Troy, N. Y. *North 59*

Cotton Yarns—Continued

instead of 50,000 shares, but the total capitalization would remain the same as at present.

John Chambliss, legal counsel for the company, who made a statement for the officers here, claims that the change is being made to enable a larger number of people to acquire stock and that this is in line with the general tendency of industry to increase the number of shareholders.

The Standard-Coosa-Thatcher Co. has gone through a remarkable period of successful and ever-increasing business. The company has no preferred stock now outstanding.

Fair Sales Increase

Lower Prices Encourage Buying, but Not Far Ahead

BOSTON.—Medium and coarse count cotton yarns have declined another half cent or so in sympathy with the co-incident decline of about the same amount in cotton futures, but the latest decline has not been so general as was that of last week and the increased resistance of many spinners to depressive influences has been partially responsible for increasing greater interest among buyers and a moderate increase in sales. A larger amount of business is in sight than at any previous period this year, but with cotton showing continued weakness the majority of users are encouraged to wait for lower yarn prices and to restrict purchases to comparatively near needs. That such business is of considerable volume in the aggregate is proved by the fact that certain local dealers have done more business thus far this month than during any previous month of this year.

The local market apparently is relatively firmer in price on most counts than other markets for the bottom here is a basis of 34 to 34½c for 20s-2 carded warps and 29 to 29½c for 10s frame spun cones, whereas quotations a half cent lower are occasionally reported elsewhere. Furthermore, for a yarn of good average quality 35c and 30c are respectively the bottom prices locally. Less buying than last week is reported for deliveries extending through the balance of the year, with the bulk of current business confined to October-November delivery. The encouraging feature of recent buying has been a considerable demand for hosiery yarns for export.

It is also worth noting that the bulk of recent business has been done on the coarser counts of both carded and combed yarns, although somewhat increased interest is shown in the finer counts. Combed and fine count carded yarns are not quotably changed from last week, although the cottons used in such yarns are showing relatively greater weakness than the shorter cottons. It is possible that if this part of the yarn market was thoroughly tested by a demand of fair volume it would develop more weak spots than are at present apparent.

Obituary

Henry C. Grimwade

Henry C. Grimwade, treasurer and manager of the Charlton Woolen Co., Charlton City, Mass., died at his home in that village on Sept. 17, after being in ill health for several months. He was 56 years old, a native of England and came to this country in his youth, settling in Charlton. His first connection was with the former Akers & Taylor Mfg. Co., Charlton, later becoming its superintendent. When the company was reorganized in 1916 under its present name he became treasurer and manager, retaining these positions until his death. He was with the two companies for 28 years. Mr. Grimwade was an active member of the Manufacturers' Textile Association and its president in 1925. He was also a member of the American Association of Woolen & Worsted Manufacturers, a 32d. degree mason, a former selectman of the town, a director of the People's National Bank, Southbridge, Mass., and a trustee of the Southbridge Savings Bank. He leaves a widow, one daughter and a son, Roger M. Grimwade, secretary and superintendent of the Charlton Woolen Co.

Judson H. Root

Judson H. Root, retired wool dealer of 281 Washington Street, Hartford, Conn., died Sept. 14 at his home in that city at the age of 88. Mr. Root was born in Hartford May 29, 1840, and was the son of the late Jesse Root, who delivered the address of welcome to George Washington when he visited Hartford. Mr. Root attended public schools and at the age of 16 became a clerk in the wool establishment of E. N. Kellogg & Co. In 1867 the partnership of Judd & Root was established to succeed the Kellogg company and this partnership existed for three years, after which it was dissolved, Mr. Root retiring. Later he became interested in the New England Sherardizing Co., New Haven. He was a director of the First National Bank and the last surviving member of the old City Guard. He is survived by a daughter, two nephews, two nieces and three grandchildren.

Michael J. Keane

Michael J. Keane, for several years a well known figure in the knitting industry at Amsterdam, N. Y., died last week from heart disease. He was born at Waterford, N. Y., and was 67 years old. Leaving that city at an early age he went to Amsterdam and secured a position in the knitting plant of A. V. Morris & Sons. For a number of years he served as general superintendent of the plant. He was prominent in political and fraternal circles. The survivors are the widow, two sons and three daughters.

William Baillie

William Baillie, pioneer textile manufacturer of Cohoes, N. Y., died last week from cerebral hemorrhage following a fall near his home. He was born in Scotland but had resided in this country

Uniform Soft Feeling Cotton Knit Underwear

Judging from the recent sales of Cannon Underwear Yarns—cotton knit underwear is far from being passé. It stands to reason that nothing can quite replace cotton here. Its absorption, its coolness, and its absolute cleanliness always will insure an active market for this class of garments.

The name "Cannon" stands for high-quality underwear yarns. Knitters who are keen to reduce production costs and at the same time produce a knit product of ready sales appeal make up the Cannon clientele.

A complete range of counts and put ups are available for your needs.

THE CANNON MILLS

INC.

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Boston
Utica, N. Y.

SOUTHERN MERCERIZING CO.
TRYON, NORTH CAROLINA

Our Specialty—
SINGLE Mercerized

Yarn for Splicing and Plaiting

Single Mercerized Yarns up to 100/1—Also Two Ply Mercerized 100/s to 140/s
Tinted yarns Licensed under Patent No. 1,496,696.

Wire or write us for prices and samples

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TRYON, NORTH CAROLINA

Sole Selling Agents for United States and Canada
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NATIONAL YARNS

. . . and Singles

We don't limit our cotton yarns to 2-plies. For many of our customers want singles, too, with our stamp of reliable processing. . . .

We offer singles in any count . . . mercerized, dyed and bleached just as evenly and thoroughly as their 2-ply brothers. *Write us for samples.*

NATIONAL
YARN & PROCESSING CO.

Complete Line of Single and Two-ply Mercerized, Dyed and Bleached Yarns . . . also dyed rayon

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Charlotte, N. C. — Cosby & Thomas, Johnston Building
New York — The Manley-Johnson Corporation, 260-266 West Broadway
Philadelphia, Pa. — Stewart McConaghy, 6908 Cresheim Road
Reading, Pa. — Edward Shultz, 712 North 5th St.

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Dyers, Bleachers and Mercerizers of Cotton Yarns in Warps or Skeins

High Class Mercerizing in warps Only — Fast Colors A Specialty

A new plant, latest and most modern machinery and equipment, backed by thirty-five years of specialized experience, guarantees service and satisfaction.

The Halliwell Company
PAWTUCKET, RHODE ISLAND

S. L. DIGGLE MANAGER — ACME SALES CO. — CHARLOTTE N. CAROLINA

SINGLE or PLY
Natural---Gassed---Dyed---Bleached
MERCERIZED YARNS
All Counts and Descriptions for the Knitting, Weaving and Converting Trade

DIXIE
MERCERIZED YARNS

Cotton Yarns—Continued

virtually his entire life. In 1895 he formed a partnership with Daniel Duncan and for many years the firm operated a large dyeing plant on Remsen St. He disposed of his interest several years ago. He is survived by one brother.

Harry I. Mabbett

Harry I. Mabbett, for several years a member of George Mabbett & Sons, Plymouth, Mass., woolen manufacturers, died suddenly Sept. 13 of acute indigestion. Mr. Mabbett was born in Central Falls, R. I., and was 42 years old. He had resided in Plymouth for the last 30 years and divided his time between Boston and Plymouth for several years in the interest of his firm. During the World War Mr. Mabbett held an executive position with the Massachusetts Red Cross. He is survived by two brothers, George Emery Mabbett and James Mabbett, one son and a sister.

John J. Gill

John J. Gill, for many years prominent in textile circles at Cohoes, N. Y., died last week at his home after a brief illness. At an early age he took a position in one of the large knitting mills where he learned the spinning trade thoroughly and advanced to the position of superintendent. He was connected with mills at Cohoes and Waterford up to ten years ago when he removed to Bennington, Vt., where he had been employed as boss spinner in the plant of the Bradford Knitting Co.

Arthur E. Miville

Arthur E. Miville, night electrician at the plant of the Amoskeag Mfg. Co., Manchester, N. H., was electrocuted Sept. 11 while at work in the southern division power plant of the company. Mr. Miville was 42 years old and a native of Manchester. He had been employed as night electrician for several years and is survived by his mother, a sister and two brothers.

Carlton H. Winegar

Carlton H. Winegar, an overseer for the Bay State Thread Works, Springfield, Mass., died at his home in Mittineague, Mass., on Sept. 11, after a lingering illness. He was 46 years old and a native of Lee, Mass., going to West Springfield 20 years ago. He was a member of the masonic fraternity. He leaves a widow.

Edward L. Connor

Edward L. Connor, who with his brother, James Connor, founded the Connor woolen mills in Holyoke, Mass., and operated them for a period of years, died in the Springfield Hospital, Springfield, Mass., Sept. 13, at the age of 78 years.

James A. Wing

James A. Wing, for more than 20 years foreman of the moulding department of the Saco-Lowell Shops, Lowell, Mass., textile machinery manufacturers, was found dead of gas poisoning at his home in Lowell on Sept. 17.

Roy Spratt

Roy Spratt, aged 52, an official of the American Yarn & Processing Co., of Mount Holly, N. C., died suddenly last week, at his home in Mount Holly.

Wastes Following Cotton

Dealers Adapting Themselves to a Lower Cotton Basis

BOSTON.—The cotton waste market is without improvement. Continued fall in cotton is reducing traders' operations in cotton wastes to a low point and producing a semi-chaotic market. Some who have sold wastes short are of course in a favorable position at the moment but as a whole the market is a very difficult one in which to conduct operations and losses are as numerous as profits. The cotton waste trade cannot operate to any advantage in a declining cotton market such as we have at this time. Manufacturers are still holding off purchasing either of cotton or its wastes under the impression that lower prices are to be seen and are likely to become permanent. The manufacturing ideal for the cotton price this season is around 16-17c on which it is said business will be able to show an expansion. Cotton wastes of course will follow the leader in any case and in the meanwhile waste dealers are doing very little and are awaiting with as much patience as possible some favorable turn in the situation.

Choice spinnable materials remain firm in the local market although demand is still in small volume, on the other hand incoming supplies show considerable restriction. The situation is therefore very firm. In average strips the supply is fully equal to the demand and prices are rather easy. In low-grade stocks output has been in good volume and as demand has been slow for a long period stocks continue to accumulate, if not in dealers' hands, then somewhere else.

The Manchester English market continues exceedingly difficult with only a limited trade moving in any direction. The uncertain outlook for cotton is emphasized and bearish features still predominate. Consumers of most qualities are buying from hand to mouth. Values however are on a more reasonable basis than was the case a couple of months ago and it is expected that the position will be sufficiently settled before long to enable buyers to be more confident.

Current Quotations

	Nominal
Peeler comber	16½—17c.
Peeler strips	15 —15½c.
Sak. comber	15½—16½c.
Choice Willowed fly	8 — 8½c.
Choice Willowed picker	5½— 6c.
Sak. strips	17½—18½c.
Linters (mill run)	5½— 6c.
Spoolers (single)	11 —11½c.
Fine White cop	13 —13½c.

Class in Drawing at N. Y. Evening Textile School

A class in Free Hand Drawing and Cartooning with individual specialization will be held every Monday, Tuesday, Wednesday and Thursday evenings from 7 to 9 p. m., at Textile Evening High School, 30th St. near 6th Avenue, New York City. Students may register for two or four evenings. Edwin F. Beemer, is the instructor.

J. B. JAMIESON COMPANY
COTTON YARNS
38 Chauncy St. BOSTON, MASS

LAVONIA MFG. CO.
LAVONIA, GA.
COLORED and NOVELTY YARNS
RATINE YARNS
FANCY TWISTS
Represented By
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MONUMENT MILLS, Housatonic, Mass.
HIGH GRADE COTTON YARNS, White, Colors, Bleached
On Beams, Jack Spools, Cones, Skeins and Chain Warps
FAST-BLACKS & COLORS For Woolen Mills a Specialty } WE SELL DIRECT

GATE CITY COTTON MILLS
Manufacturers of Superior Quality
WHITE KNITTING YARN on CONES
We sell direct to Knitters and guarantee satisfaction
P. O. Box 1677 ATLANTA, GA.

INDUSTRIAL YARN CORPORATION
Weaving—COTTON YARNS—Knitting
88 LEONARD STREET, NEW YORK

O. S. HAWES & BRO.
FALL RIVER, MASS.
COTTON YARNS ALL FORMS AND NUMBERS

JOHN F. STREET & CO.
COTTON YARNS
CHICAGO 201 Industrial Trust Bldg., PHILADELPHIA PROVIDENCE, R. I. NEW YORK

THE J. R. MONTGOMERY CO. WINDSOR LOCKS, CONN.
Manufacturers of
MERCERIZED COTTON YARNS Give the high Silk-like lustre In Knit Goods and Woven Fabrics
NOVELTY YARNS Poucle, Bourette and Spirals in Cotton, Wool, Worsted, Mohair and Silk.
COTTON WARPS On Beams, Jacks, Spools and Tubes In Fancy Twist, Colors and Printed

WM. WHITAKER & SONS
Olney, Philadelphia
COTTON CARDING and CARDED COTTON
Roving, Shuttle Cops, etc.

EWING-THOMAS CONVERTING CO.
Specialists in Mercerized Yarns CHESTER, PA.
Warp Mercerizing for the Trade
Gassed—Natural—Bleached—Colors
DOUBLE MERCERIZED SPECIAL PROCESS

Evenly Mercerized

BURLINGTON MERCERIZED

COTTON YARNS

Counts—16s-2 to 120s-2

Burlington Processing Co.

Excelsior Yarn Co.

Burlington, N. C.

Mercerized, Singles and Ply
Novelty Twist and
Glanzstoff Rayon

Sole Sales Agts. in Carolinas & Va.
for BURLINGTON PROCESSING CO.
MAYFAIR MILLS
AMERICAN GLANZSTOFF CORP.

FALLS MANUFACTURING COMPANY
MANUFACTURERS OF
COMBED KNITTING YARNS
36s To 40s

High Grade Combed Peeler Yarns

Manufactured where climatic conditions are ideal.
Made especially for Ladies' Fine Gauge Underwear.

FALLS MANUFACTURING CO., *Granite Falls, N.C.*
Selling Agent, P. L. Gilkey, Lafayette Bldg., Phila., Pa.

QUALITY FIRST

American Thread Company YARNS

JAMES AUSTIN & SON
260 West Broadway, New York
Selling Agents

Insulating Yarns a Specialty

CATLIN & COMPANY, Inc.

COTTON YARNS

SOLE AGENTS FOR
LAWTON SPINNING COMPANY
and other mills furnishing full range of all numbers

NEW YORK BOSTON PHILADELPHIA CHICAGO

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TAPES, BRAIDS & BINDINGS

SPINNING TAPES AND SPINDLE BANDINGS
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COTTON YARNS

Combed *Carded* *Mercerized*

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SOLWAY DYEING & TEXTILE CO.

PAWTUCKET, R. I.
Dyers, Bleachers and Mercerizers of Cotton Yarns, Warps or Skeins
ABSOLUTELY FAST COLORS

COTTON WARPS

DANA WARP MILLS, Westbrook, Maine
WHITE and COLORED SINGLE and PLY

Cotton Yarn and Warps, Carded and Combed
SELL DIRECT

COTTON YARNS
PLUS
SERVICE

ANY COUNT OR VARIETY
EASTERN OR SOUTHERN
GREY OR PROCESSED

Advice Based on Our Experience of Thirty Years in Bleaching, Dyeing, Mercerizing, Etc., at Your Service

E. J. McCaughey, 51 Arlington St., Pawtucket, R. I.

KROUT & FITE MANUFACTURING CO.

Manufacturers of
Silk, Cotton and Mercerized Narrow Fabrics
SPOOL TAPES A SPECIALTY
Telephone Connection. Office and Mill, Allegheny Ave. and Emerald St., Philadelphia

WINDERS
Cop and Skein
For Wool
Cotton or Silk

HARLEY-KAY, LIMITED
BUILDERS OF HIGH GRADE KNITTING MACHINERY
GEORGETOWN, ONTARIO

YARN
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Accessories

RUGGED CONSTRUCTION SERVICEABLE

"COLUMBUS TAPE"

GEORGIA WEBBING & TAPE CO. COLUMBUS, GA.

SPINNING RINGS
TWISTER RINGS
SILK RINGS
DIAMOND FINISH

TRAVELER CLEANERS
TRAVELER CUPS
GUIDE WIRE SETS

WHITINSVILLE
SPINNING RING CO.
WHITINSVILLE, MASS.
SPINNING RING SPECIALISTS
FOR MORE THAN FIFTY YEARS

PHILA. COTTON YARN CO.

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YARNS
KNITTING WEAVING

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C. MOORE & CO.
Manufacturers of
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Jacquard Harness Twines of all kinds on hand and made to order
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BOOTT MILLS
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COTTON YARN
LOWELL, MASS.
TEL. 4410

COTTON

Cotton Declined Further

More Scale Down Buying Below 17½c—Southern Hedge Selling

THE selling movement which developed in the cotton market here or which was renewed with increased confidence after the publication of the Government crop report on Sept. 8, has continued this week. The tropical storm which reached the Florida coast on Tuesday and turned northeastward causing very heavy rains in Florida, Georgia and the Carolinas, slowed down the selling but seemed to be discounted on moderate rallies, and on Wednesday the decline extended to the 17¼c level. The market then showed signs of a firmer technical position while the price appeared to be coming in for greater consideration as a possible factor in the further course of values and rather a better tone developed. But sentiment was still more or less unsettled, with the average trader rather inclined to doubt whether increasing receipts would be absorbed without further weakness.

The unfavorable weather and crop reports noted during the first week in September was followed by clearing conditions which continued over the greater part of the belt during the week. The heavy rains in the eastern belt, however, were distinctly unfavorable, and while it is doubted whether they caused any actual loss to the crop, it is believed they must have lowered the grade of cotton open in the fields. Further information along these lines is awaited, but in a general way the trade seems agreed that the progress of the crop since the date of the last Government canvass has indicated deterioration. Whether greater deterioration than that allowed for in the Sept. 1 indication, however, is another matter. On the whole, the trade is inclined to think that there has, perhaps, been nothing to cause any substantial change in crop ideas during the first half of this month.

Ginning has evidently been on the increase and hedging has been correspondingly more in evidence. With trade demand chiefly on scale down orders, the almost steady dribble of selling orders from the South has seen largely responsible for weighing down prices. It is reported that with favorable weather for such work, Texas farmers have been picking rapidly, and it is also said that they have been selling their cotton as rapidly as it became available. An easing of the basis has also been reported with rumors that cotton was selling at about a tenderable basis as compared with the New York market. As a result October contracts have been selling on about even terms with December, although there is little certified cotton here for delivery next month. The talk is that more may be brought here, but up to the close of this week, there has been no definite development in that direction.

The following table shows Wednesday's closing quotations in the leading spot markets of the country, with the usual comparisons:

Market	Sept. 12	Sept. 19	Change	Last Year	Sales
Galveston	17.70	17.45	— 25	20.85	12,269
New Orleans	17.54	17.12	— 42	20.43	33,369
Mobile	17.30	17.00	— 30	20.10	430
Savannah	17.53	17.13	— 40	20.57	1,111
Norfolk	18.00	17.31	— 69	20.50	1,475
New York	18.30	17.95	— 35	21.00	3,884
Augusta	17.63	17.38	— 25	20.44	3,206
Memphis	17.40	16.65	— 75	19.85	16,866
St. Louis	17.50	16.50	—100	19.75	....
Houston	17.65	17.25	— 40	20.80	106,735
Dallas	17.00	16.70	— 30	19.95	138,829

The following differences on and off middling are given as compiled from the report received by the New York Cotton Exchange. The cotton grades marked ** are not deliverable on contract:

	Dallas	Memphis	Montgomery	Augusta	Average
WHITE GRADES					
M. F	1.00†	1.00†	.70†	.94†	.86†
S. G. M	.65†	.75†	.55†	.75†	.62†
G. M	.40†	.40†	.40†	.38†	.40†
S. M	.30†	.25†	.25†	.25†	.26†
S. L. M	.40*	.25*	.38*	.25*	.34*
L. M	.90*	.50*	.88*	.50*	.81*
S. G. O.**	1.90*	1.10*	1.38*	1.00*	1.48*
G. O	2.75*	1.85*	2.00*	1.75*	2.23*
YELLOW TINGED					
G. M	.25*	.25*	.40*	.25*	.33*
S. M	.50*	.75*	.65*	.50*	.64*
M.**	1.25*	1.00*	1.25*	.75*	1.11*
S. L. M.**	2.00*	1.50*	1.75*	1.38*	1.09*
L. M.**	2.75*	2.25*	2.50*	2.38*	2.42*
YELLOW STAINED					
G. M	1.00*	1.00*	1.00*	.75*	.78*
S. M.**	1.75*	1.25*	1.50*	1.50*	1.66*
M.**	2.75*	1.50*	2.25*	2.00*	2.38*
BLUE STAINED					
G. M.*	1.75*	1.50*	1.50*	1.75*	1.48*
S. M.*	2.25*	2.00*	2.25*	2.50*	2.10*
M.**	3.00*	2.50*	3.00*	3.50*	2.87*

*Off middling. †On middling.

Cotton Statistical Data

(Fluctuations of Futures)

	Closed Sept. 13	For Week High	For Week Low	Closed Sept. 19	Net Change
September	17.60	17.73	17.42	17.73	+.13
October	17.55	17.83	17.31	17.68	+.13
November	17.54	17.54	17.37	17.68	+.14
December	17.51	17.80	17.28	17.67	+.16
January	17.45	17.79	17.25	17.63	+.18
February	17.44	17.62	17.31	17.62	+.18
March	17.43	17.72	17.20	17.60	+.17
April	17.44	17.59	17.29	17.59	+.15
May	17.45	17.67	17.22	17.57	+.12
June	17.40	17.53	17.23	17.53	+.13
July	17.35	17.55	17.12	17.52	+.17

Spot Fluctuations for Week

(Middling)

	New York	N. Orleans	Liverpool
Friday, Sept. 14	17.80c	17.10c	.....
Saturday, Sept. 15	17.65c	16.91c	.....
Monday, Sept. 17	17.90c	17.15c	9.77d
Tuesday, Sept. 18	17.65c	16.95c	9.94d
Wednesday, Sept. 19	17.95c	17.12c	9.78d
Thursday, Sept. 20	17.90c	17.24c	9.97d

Spot Fluctuations and Stock

	Prices Sept. 19	Stocks This week	Stocks Last year
Galveston	17.45	238,956	293,480
New Orleans	17.12	97,844	772,226
Mobile	17.00	5,645	37,265
Savannah	17.13	26,159	112,018
Charleston	.....	15,938	41,667
Wilmington	.....	1,474	6,927
Norfolk	17.31	14,265	20,513
Baltimore	17.60	886	654
New York	17.95	10,628	211,765
Houston	17.25	.....	455,194
Augusta	17.38	18,164	62,728
Memphis	16.65	59,370	61,251
St. Louis	16.50	1,928	329
Little Rock	16.78	6,655	11,596

Precise

as to count and twist

One of the advantages of dealing with Quissett. A certain count, a certain twist means just that—nothing else. Quissett vigilance permits of no discrepancy.

Quissett offers a yarn service thoroughly in keeping with modern day requirements. A complete divergency of counts and twists are available. We furnish yarns for knitting and weaving requirements ranging from underwear to lace curtains.

Let Quissett provide the foundation for your new line.

Carded and Combed Cotton Yarns in all Numbers and Descriptions.
Ply Yarns our Specialty.
Egyptians, Sea Island, Peelers, Sakelarides, Pimas, and Peruvians.

Quissett Mill

New Bedford, Mass.

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QUISSETT MEANS QUALITY

STANDARD-COOSA-THATCHER CO.
Mercerizing Plant Spinning Mills
CHATTANOOGA, TENN.

Economy in Knitting

Specialization in mercerized yarn for the knitter has resulted in consistent quality, uniformity and knitting economy---The knitter who has used Standard Mercerized Yarn knows.

STANDARD-COOSA-THATCHER CO., Chattanooga, Tenn.
SALES OFFICES: LAFAYETTE BLDG., PHILADELPHIA
456 FOURTH AVE., NEW YORK
CANADIAN REPRESENTATIVE: WM. B. STEWART & SONS, LTD., TORONTO—MONTREAL

Standard

MERCERIZED YARN

Cotton—Continued

Cotton Trading Limited

Memphis Reports Gain in F. O. B. Business Spots Are Dull

MEMPHIS, TENN., Sept. 17.—Declines in cotton contract values may have limited spot transactions here; if so the effect was less noticeable because of the stagnation of previous weeks. Sales out of local stocks were small but f. o. b. business was larger than for some time. Most of the business is for immediate or nearby shipment of small lots of 7/8" to 1 1/16" to Georgia and the Carolinas. Price ideas are interfering with development of forward business; there is considerable inquiry, prices to be fixed later, but basis suggested is unsatisfactory to shippers. There is little demand for staples and premiums have been further reduced. Strict middling 1⅛" is quoted at 225 points on Decembers, 1 3/16" at 300 on and 1¼" at 550 on; notwithstanding that these quotations are much below normal, concessions are necessary to effect sales; as a matter of fact, for the time being at least, there is no such thing as basis.

While first hands are offering freely about as fast as cotton is ready for the market, demand is so inadequate that selling is largely competitive in character. Most of the offerings come from growers who find it necessary to market their early receipts to provide funds for further harvesting; others, owing to the unsatisfactory condition of the market, are picking but are delaying the ginning. Sentiment as to the market is divided and ideas as to the size of the crop are far apart—results probably of the spotted condition of the crop.

Weather conditions during the week were favorable for the harvest, with plenty of cotton open to justify full employment of pickers. The labor supply is ample if weather conditions during the harvesting period are favorable. It is also pretty generally agreed that the weather during the week was favorable for the crop, although fully 75% of it is so far advanced toward maturity as to have been benefited but little. There is considerable complaint of small bolls, concealed damage by weevils and poor outturn. Ideas as to the delta crop in Mississippi range from 625,000 to 700,000 bales. The crop in southeastern Arkansas is poor; the crop in east-central and northeastern portions of the state is fair to good and has been affected by weevils to a negligible extent.

Market Statistics

Basis Middling

	Saturday, Sept. 15	Saturday, Sept. 8
10 markets average	16.74	18.69
Memphis	16.35	18.69

Premium Staples

First Sales from Factors Tables at Memphis

Grade Strict Middling	Prices Nominal
1 ⅛-in.	19½@20c
1 3/16-in.	20 @20⅝c
1 ¼-in.	22½@23c

Current Sales

	For week	Prev. week	Week before
Memphis total	12,676	5,308	4,455
F. o. b. included	12,226	625	4,455
10 markets	154,946	109,546	70,557

Memphis Receipts, Shipments, Etc.

	For week	Last year	Year before
Net receipts	2,614	3,806	7,824
Gross receipts	6,307	12,922	15,661
Total since Aug. 1, net	6,131	11,804	13,743
Shipments	9,281	15,497	14,431
Total since Aug. 1	58,617	77,954	116,586
Total stock	54,234	56,583	117,908
Decrease for week	2,874	2,574	*1,230
Unsold stock in hands of Memphis factors	12,684	18,956	44,500
Increase for week	1,184	1,206	3,000

* Increase.

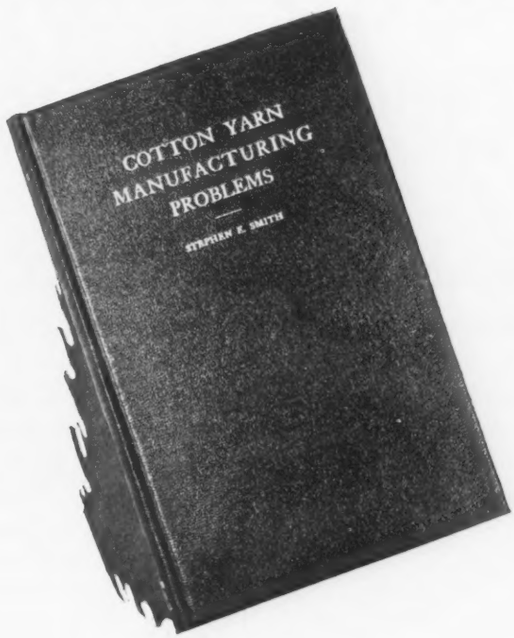
Basis Also Weakens

Extreme Selling Pressure on Actual Cotton and Futures

BOSTON, Sept. 19.—Shippers appear to be swamped quite as much by extra staples as by the shorter cottons, and there is so little mill buying that their selling of hedges is an important factor in keeping prices close to recent low levels. The indifference of spinners is causing shippers to accentuate selling pressure and basis on nearly all cottons has now touched low levels for the season, and on extra staples is close to the minimum levels of the last big crop year. In New England markets business is so narrow that it is extremely difficult to quote prices that are an actual reflection of the market, and it must be freely admitted that reports from the South indicate that our figures may be bettered by shrewd buyers anywhere from 50 to 100 points. For instance, there are reports of Association 8s in Delta cottons of strict middling grade being offered as low as 450 points on October, and middling at 400 on, whereas we are quoting the minimum on the latter approximately 500 points on October. Even more difficult is it to get fairly accurate quotations on the longest staples, but according to reports from usually reliable sources a basis of 850 points on October is the very top of the market for a full 1¼ in. hard western cotton of middling grade. The shorter premium cottons are relatively firmer in price, particularly in middling and better grades, but on lower grades there is a wide variation in basis reported.

The Egyptian market has been relatively weaker than that for domestic cottons, but on both Uppers and Sak. there was an advance today of ⅛ to ¼c from yesterday's lows. Uppers now look fairly cheap as compared with prices of domestic cottons of similar length and grade, but Sak. remains relatively high in price excepting when compared with present nominal prices of Pima cotton. The net decline for the week on November Sak. was $2.18 and approximately the same for the January option. October Uppers show a net decline for

(*Continued on page 99*)



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WORSTED YARNS

More Activity Seen In Medium Tops

Are Medium Tops Too High or Fine Tops Too Low Is the Question—Noils Steady

BOSTON.—More activity has been seen in the top market during the past week. The call for fine tops has been chiefly for piecing out purposes. Some top makers state that fine top prices are now so near to half blood and 58s that an upward revision in price is likely to occur, providing the general market in wool and tops maintains its present firm position. The new business placed during the week has been almost entirely in tops made from domestic wools grading from 46s up to 48s. Most combing mills have been rushed for delivery on these medium grades. Tops made from foreign wools continue very inactive.

A fair business is being done in the finer grades of white noils on Summer Street but the medium quality and the low grades are still neglected and as there is a substantial accumulation of these commodities owing to the large use of medium wool by worsted manufacturers and others for year to date there seems little reason to expect any rise in values in the near future. Following a larger mill interest in colored drawing lap some inquiry has developed for fine recombed colored noils. These commodities have been produced in very small quantity during the year and the foreign markets have not been favorable to any imports.

Stocks of noils in the Bradford market are small and production of these wool by-products is very much curtailed. The domestic demand is very spotty and buying by American interests is small although the Continent is taking small quantities steadily. Weakness in the top market has not yet communicated itself to noils and it will be the policy of wool combers to maintain as long as possible current strong values on these commodities.

Top and Noil Quotations

Tops—Boston

Fine	(64–66s)	$1.38/1.39
Half-blood	(60–62s)	1.35/1.36
High ⅜ blood	(58s)	1.27/1.28
Aver. ⅜ blood	(56s)	1.25/1.26
Low ⅜ blood		1.17/1.18
High ¼ blood	(50s)	1.15/1.16
48s N. Z.		1.10
46s S. A.		1.07/1.08
44s		1.00
40s		.90/ .91
36s		.90/ .91

Tops—Bradford, Eng. (Sept. 13)

Fine	(70s)	53d
Fine	(64s)	50½d
Half-blood	(60s)	48d
Half-blood, low	(58s)	44d
Three-eighths blood	(56s)	38d
Quarter-blood	(50s)	30d
Cross-bred	(46s)	25½d

Noils—Boston

Fine	$1.00–$1.05
Half-blood	.92– .97
High ⅜ blood	.80– .85
Aver. ⅜ blood	.68– .73
Low ⅜ blood	.63– .65
High ¼ blood	.60– .62
46s	.53– .55
44s	.50– .52

Yarn Institute a Possibility

Cooperation by Three Groups Being Planned

Philadelphia.

REPORTS have been published in these columns during recent weeks of the development of a cooperative spirit among sales worsted yarn spinners and the probability of the formation of a new yarn cooperative group to be called a worsted yarn institute. Through such an organization it is expected material benefits will not only accrue to spinners themselves but to the entire worsted industry, manufacturers of goods, buyers and consumers of worsted goods. There are now definite indications progress has already been made along these lines and announcement of the formation of such an organization may be expected within the next month or two.

Started Year Ago

This had been a gradual development dating back for more than a year and the cooperation of a large enough percentage of the industry has already been obtained to make the formation of a yarn cooperative group practically a certainty. The new group will contain spinners in all three sections of the trade, French, Bradford and knitting yarns. A more cooperative viewpoint has been developing among spinners during the last year and the stability of prices during recent months, notwithstanding lack of a satisfactory volume of business during most of this time is given as evidence of this. A number of manufacturers of outerwear, for example, have recently stated that if a better spirit of cooperation among spinners of these yarns had not existed there would have been a disastrous condition in the yarn market which would have resulted in unsatisfactory business with manufacturers as well as spinners.

Manufacturers as a rule state they are in favor of stabilization of yarn prices so far as the raw material market permits and this is as far as spinners are endeavoring to go. They are not trying to obtain more money from manufacturers for the same yarns but to formulate some way in which the yarn business may be placed upon an efficient basis taking into consideration the lack of balance between consumption and production.

Spinners Need Cooperation

In the past demoralization of the worsted spinning business has resulted in a similar condition among consumers of worsted yarns in a large number of instances. One example will suffice. When a men's wear manufacturer buying from hand-to-mouth placed a yarn contract for 50,000 lbs. to cover an actual goods order and the next day one of his competitors quotes a lower goods price based on a much lower yarn quotation from another spinner, the first manufacturer frequently had his goods order cancelled.

In this instance bad effects were felt by spinners and by both manufacturers. The first manufacturer lost an order; the first spinner lost an order while the second manufacturer booked an order which he did not know whether he would be able to keep until delivery had been made and the second spinner booked a no-profit order which would make it more difficult for him and others to sell even at that price in future sales.

Stabilization an Aim

Stabilization of yarn prices upon a fair basis in proportion with current raw material prices will prove of benefit to manufacturers as well as to spinners, according to leaders in the present cooperative movement and it is because of this they look for a favorable reaction when the announcement of their plan is made. A number of manufacturers in criticising the proposition point to lack of business in outerwear yarns at the present $1.50 level as proof of their belief cooperation among spinners will tend to reduce the total volume of business. Others point to the fact that $1.50 level has not been brought about by spinners but rather by price changes in the wool market. Spinners were cooperating in groups when outerwear counts were selling several months ago at $1.40 and it was at that level the largest volume of business this year was placed by sweater and bathing-suit manufacturers.

The fact of the matter is, manufacturers are not refusing to buy at this time because of the $1.50 level but for two other reasons. First, they have lower priced yarn contracts which will run for several weeks yet, one spinner stating they are delivering on several $1.37½ contracts for 2-20s while others are still shipping on $1.40 contracts. Manufacturers having these low priced contracts are not anxious to buy ahead at this time because they wish to buy yarns only when new goods orders are booked and also because they believe prices are too high to speculate.

Good Sales Awaited

The current price range of worsted yarns has not been tested so far as selling goods in volume by manufacturers is concerned. This will be determined during the next few months. Spinners believe stocks of yarns in their hands and in the hands of manufacturers are so small that a normal business will develop this fall. They do not believe prices are too high although they admit that it is probable that as large a volume of outerwear yarn business will not be done as when the price range for these counts was at $1.40 or ten cents under the prevailing basis. The same applies to men's wear yarns which are selling at prices above those of the last season. Spinners do not believe prices will retard sales but rather the yarn situation must adapt itself this fall to general business conditions of hand-to-mouth sales until the upward trend is felt in the worsted industry generally, which a majority look for in the next month.

WORSTED YARN QUOTATIONS

(Corrected to Close of Business Wednesday)

Bradford System

2-12s, low com. (36s)	1.15-1.20
2-16s, low com. (36-40s)	1.20-1.25
2-20s to 2-24s, low ¼ (44s)	1.30-1.35
2-20s to 2-26s, ¼ bld. (46-48s)	1.37½-1.42½
2-26s to 2-30s, ¼ bld. (48s)	1.50-1.55
2-30s to 2-32s, ¼ bld. S. A. (46s).	1.50-1.55
2-32s, ¼ bld. (48-50s)	1.62½-1.65
2-20s, ⅜ bld. (56s)	1.65-1.67½
2-26s, ⅜ bld. (56s)	1.70-1.72½
2-36s, ⅜ bld. (56s)	1.77½-1.80
2-32s, ½ bld. (60s)	1.75-1.77½
2-36s, ½ bld. 60s)	1.80-1.82½
2-40s, ½ bld. 60s)	1.85-1.87½
2-50s, high, ½ bld. (64s)	2.05-2.10
2-50s, fine, (66-70s)	2.10-2.15
2-60s, fine, (70s)	2.65-2.70

French System

20s, high, ¼ bld. (50s)	1.52½
20s, ⅜ bld. (56s)	1.65-1.67½
26s, ⅜ blood (56s)	1.70-1.72½
30s, ½ bld. (60s)	1.80-1.82½
30s fine warp (66-70s)	1.87½-1.92½
40s, ½ bld. (60-64s)	1.90-1.95
50s, (66-70s)	2.12½-2.17½
60s, (70s)	2.62-2.72

Knitting Yarns in Oil (Bradford)

2-20s, low, ¼ bld. (44s)	1.25-1.30
2-18s to 2-20s, ¼ bld. (50s)	1.50
2-26s, ¼ bld. (50s)	1.55
2-30s, ¼ bld. (50s)	1.60
2-20s, ⅜ bld. (56s)	1.65
2-20s, ½ bld. (60s)	1.80-1.85

French Spun Merino White

30s, 50-50	1.35-1.37½
30s, 60-40	1.45-1.47½
30s, 70-30	1.55-1.57½
30s, 80-20	1.65-1.67½

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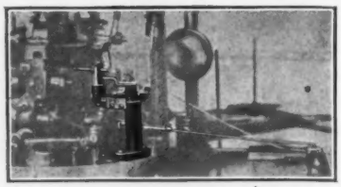

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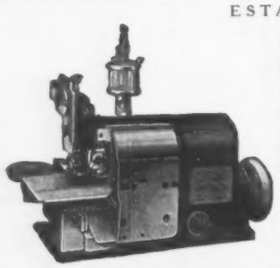

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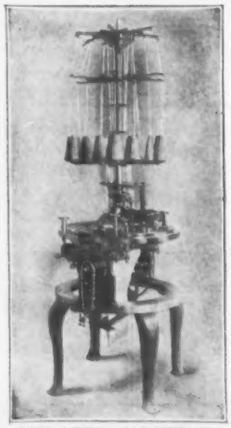

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Worsted Yarns—Continued

Yarn Outlook Improves

Additional Good Business However Slow in Arriving

BOSTON.—The worsted yarn industry is marking time but the undertone is better and there is more optimism in the situation. New business is still slow and particulars against only contracts are not arriving in volume. The orders which have appeared since the goods opening if spread over the industry would hardly have any appreciable effect to date. A beginning in the right direction has, however, been made and unless precedents fail October and November ought to see some good revival in the sales spinning industry.

Prices on the medium crossbred qualities are stronger. Spinners have been able to depress to their advantage prices on the several fine tops but the ⅜s blood grades in particular are very firm. The renewed strength in domestic ¼ blood wool based on limited amounts available from the domestic clip has also to be reckoned with. Consumers of 2-36s, ⅜s blood, weaving yarns are it is said inquiring for these yarns to be made from ¼ blood. This tendency seems rather general. Knitters using fine yarns are also seeking to have them made from a lower grade of top so as to cheapen original cost. This movement, however, is not likely to have any large measure of success although in the Bradford district relatively fine counts are often spun from relatively coarse tops.

Specifications have been coming in more freely for the Bradford spinners and deliveries of yarns have been taken up rather more satisfactorily. This has tended to increase the output and from now on it is expected that there will be a tendency for machine activity to slowly expand. Prices, however, continue to sag. Quotations following this market on 2-36s, 2-48s and 2-60s are again off 1 penny per pound for the week. It is believed that if 2-48s could be made to sell at 5s 6d substantial business could be done. Recent cabled quotation is 5s 7d. Opinion in the Bradford district runs very generally to the belief that a satisfactory price basis for most yarns will be seen during the course of the next few weeks.

* * *

BRADFORD (Eng.) YARNS

	s	d
2 16s, 36s	2	4½
2 24s, 44s	2	7½
2 36s, 58s	4	9
2 48s, 64s	5	7
2 60s, 70s	6	6

Film of Utah's Sheep Lands Will Be Shown

SALT LAKE CITY, UTAH.—This State's famous sheep grazing lands will be shown to the public in a film which was recently taken by a representative of the Federal Forest Service. It was taken in order to educate the sheep men as to the proper utilization of the range.

Ga. Operating Executives Meet

(*Continued from page 29*)

the work of the operating executives in their association.

Progressive Measures

Secretaries Forbes of the Georgia Cotton Manufacturers' Association and Gregg of the Southern Textile Association, were introduced by Chairman Dennis on motion of Mr. Heymer. By-laws were amended to make past general chairmen ex-officio members of the executive committee. Mr. Heymer thought that former chairmen should be kept in harness for the good of the organization.

Chairman Dennis told of formation of local groups at Atlanta and Columbus with the idea of getting mill men to attend more generally. He said these groups had had meetings notable for free discussion and good attendance, and invited consideration of forming other local branches of the Georgia association.

Discussion of Slashing

In discussing questions on slashing under the leadership of Mr. Elliott, P. M. Matthews, superintendent, Peerless Mills, Thomaston, Ga., and Mr. Phillips both told of results secured from automatically controlling temperatures. Beginning with the size kettle and including the use of regulators to control surface heat of small and large cylinders of the slashers. Mr. Matthews said his temperature control system held moisture content in his slashed yarn to a variation of ¾ of 1% and that charts recording temperatures made the system practically foolproof. He advised use of brass pipes, as the scale from galvanized iron pipes often clogged the instruments, etc. Mr. Phillips said temperatures of his slashing processes had been automatically controlled for five years.

Mr. Hames told of replacing immersion rolls in size boxes with three smaller rolls made of two-inch brass pipe. He thought the three smaller rolls with the yarn running over and under, secured better penetration of the size than the large single roll, particularly on heavy sets up to 3,000 ends.

A brief discussion of covering squeeze rolls with woolen cloth and worsted yarn concluded the meeting.

Investigate Cost of Handkerchief Production

WASHINGTON, D. C.—A. F. Ferguson has been assigned to investigate the domestic cost of production of handkerchiefs, it was stated at the offices of the Tariff Commission. He is expected to be in the domestic field several months, it is said.

Mr. Ferguson will join a crew of cost accountants who have been detailed to work in this investigation, and will visit the principal handkerchief manufacturing and distributing centers throughout the country.

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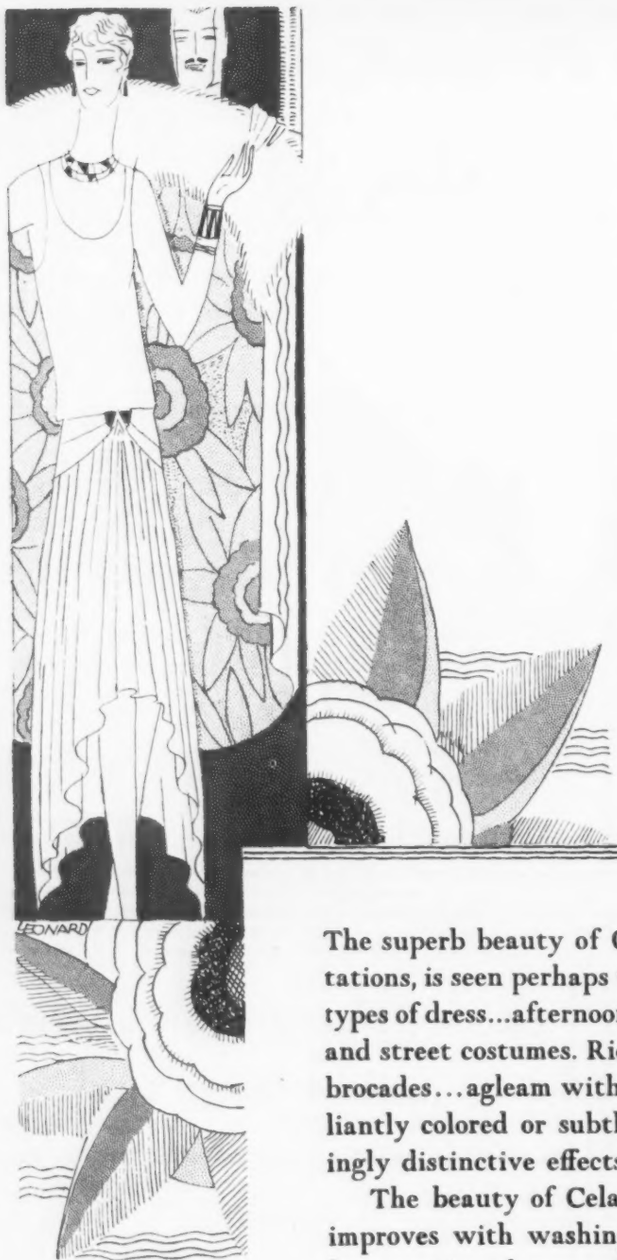

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RAYON AND SILK YARNS

Thrown Silk Rises

Small Advance All Along the Line This Week

The thrown silk market was marked this week by a rise in prices in the early part based on the firmer raw silk market and some business of note was placed by both weavers and knitters.

The daily business in this market is still of the hand-to-mouth variety, and it would seem that most buyers had now placed their business for some period to come.

Prices quoted as an average from leading throwsters are as follows:

(60 day basis)

Japan organzine, 2 thd. grand XX in skeins.	$6.50
Japan crepe, 2 thd. grand XX on bobbins....	6.60
Japan crepe, 3 thd. sp. crack on bobbins.....	6.20
Japan crepe, 4 thd. crack on bobbins.....	6.10
Canton crepe, 3 & 4 thd. ns 14/16 on bobbins	5.15
Tussah tram, 2 end on cops.....	2.70
SPECIAL HOSIERY TRAMS	
Hosiery tram, 3 & 5 thd. Japan XXX.....	6.70
Hosiery tram, 5 thd. Japan G XX.....	6.15
Hosiery tram, sp. crack XX.....	5.80
Hosiery tram, crack XX.....	6.65
Hosiery tram, XX.....	5.60

Spun Silk Firm

Prices Unchanged but Spinners Expect Advance Soon

Prices in the spun silk market remain generally unchanged but with the increased demand evidenced in the last few weeks spinners are hopeful that prices can be advanced before very long, as it is generally agreed upon by all that current prices are far below replacement values.

A lively demand still is evidenced by weavers in both the worsted and the fancy shirting trades and in every phase of the business a much more encouraging atmosphere prevails.

Prices quoted are the same as those current during the last few weeks, and quoted 2% 10 days, net 30:

40/2	$4 00
50/2	4 35
60/2	4 50
62/1	3 40

Rayon Institute Carries Information to the Retailer

Dwight Mead, merchandise expert of Rayon Institute of America, Inc., spoke before the sales personnel of Kresge's Department store this week, describing briefly the place of rayon in the mode, something of the history and accomplishments of Rayon Institute and its aim for the future, particularly stressing the point that all four processes of the manufacture of cellulose yarns produce rayon.

Much interest was displayed by the staff in the 20-minute discussion that followed Mr. Mead's talk and the showing of the film "The Romance of Rayon."

Mrs. Milhea Hall, head of the fabrics department of the Institute, talked at the Kresge store later in the week, while Mr. Mead discussed the subject of rayon before the merchandising staff of Abraham & Straus in Brooklyn.

Glanzstoff Opens Philadelphia Sales Office

The American Glanzstoff Corp. has opened a Philadelphia sales office in Room 606 Lafayette Building, Fifth and Chestnut Sts., under the management of Thomas Park, for the distribution of its rayon yarns, included those imported and those now being manufactured at the company's plant in Elizabethton, Tenn.

To Train Textile Personnel Near Belgrade

A textile school was founded in Leskovats, with the object of giving technical training and to provide an efficient personnel for textile commercial enterprises, expert office clerks for the textile industry, and teachers for the primary textile school. This report is from Consul McMillin, of Belgrade, to the U. S. Department of Commerce.

Modern Central Silk Dyeing & Finishing Co., Paterson, N. J. Capitalization of this company has been increased to $600,000.

Rayon Notes From Europe

(Special to TEXTILE WORLD*)*

GERMANY

During the last few days important deliberations have taken place on the subject of the maintenance or reduction of artificial silk prices for the coming winter season. Finally all the members of the German Artificial Silk Convention as well as those foreign producers who sell in the German market have reached complete agreement. Prices are to remain officially unchanged but certain rebates will be granted to wholesale customers and mutual guarantees have been resolved upon that these rebates will never exceed the fixed limit. Analogous agreements have been concluded with Austria and Czecho-Slovakia.

FRANCE

The present production of La Soie de Valenciennes, which is closely connected with the Dutch Breda Co., is now 3,000,000 lbs. per annum and will be increased to 5,000,000 lbs. The viscose process is employed.

* * *

The Soie Artificielle du Rhone has been established with a capital of 22,000,000 francs. The plant will be at Neuville sur Saone and an output of 2,000 kilos. of viscose rayon per day is planned. This is the company previously reported under the title of the Soie Artificielle de Neuville. It is associated with Suchet et Dufour of Lyon and also Roubaix-Tourcoing interests.

* * *

The production of the Soc. Lyonnaise de Soie Artificielle is now 1,200,000 kilos. per annum and during the course of next year will be gradually increased to 2,000,000 kilos. A new plant is to be built at St. Maurice de Beynost.

* * *

The production of the Textiles Artificiels de Reims, the formation of which has been previously announced, is stated to be 50 kilos. daily and the plans of the company are to make 5,000 kilos. daily of viscose rayon.

* * *

A reduction of prices in acetate rayon has been made by the leading French makers to conform with the recent move by British Celanese, Ltd.

ITALY

At a recent meeting of the Italian Federation of Producers of Artificial Textile Fibers resolutions were passed favoring the use of the word "rayon" in place of "seta artificiale."

* * *

Exports of rayon yarn from Italy in the first four months of 1928 amounted to 10,179,793 lbs. against 9,800,747 lbs. in the corresponding period of 1927. The main changes are shown as follows:

	January to April		
Destination	1928—lbs.	1927—lbs.	1926—lbs.
China	2,452,727	818,329	1,012,525
Germany	2,450,324	2,442,871	174,572
India	692,203	1,631,187	627,294
United States	1,347,559	1,954,884	637,516

* * *

An effort is being made to have the duties on imported artificial silk manufactures increased and the Government is giving the matter consideration.

* * *

A new trading finance company has just been formed in Italy and another in France. In both cases the president of the Snia Viscosa concern is heavily interested and it is suggested that among other objects, the exploitation of patents for the manufacture of artificial leather may be undertaken.

* * *

Rumors have been current in regard to the position of the Snia Viscosa Co., and some interesting information has been obtained by the *Financial News* of London. The paper was informed that the recent increase in capital was a great success enabling

DOMESTIC RAYON PRICES

(Producers' List Quotations)

VISCOSE PROCESS

Denier	Filaments	"A"	"B"	"C"	First Qual.	Second Qual.
75	18	.....	.....	.....	$2.55	.....
80	30	.....	.....	.....	2.60	.....
100	18	$2.15	$2.00	$1.65	.....	.....
100	40	.....	.....	.....	2.25	$1.70
125	18	.....	.....	.....	1.75	1.45
125	50	.....	.....	.....	2.05	1.40
150	24	1.50	1.45	1.35	.....	.....
150	36	.....	.....	.....	1.60	1.35
150	60	.....	.....	.....	1.75	1.35
170	24–27	.....	.....	.....	1.45	1.25
170	36	.....	.....	.....	1.50	1.25
170	60	.....	.....	.....	1.60–1.70	1.25–1.30
200	30	.....	.....	.....	1.45	1.25
200	80	.....	.....	.....	1.70	1.30
250	36	.....	.....	.....	1.35	1.25
300	40–44	1.30	1.28	1.25	.....	.....
450	54–66	.....	.....	.....	1.25	1.20
600	66–72	.....	.....	.....	1.20	1.15
900	125	.....	.....	.....	1.25	1.20
1,200	126	.....	.....	.....	1.25	1.20

NITRO-CELLULOSE PROCESS

Denier	"A"	"B"	"C"	Denier	"A"	"B"	"C"
35	$3.50	$3.25	....	125	$1.75	$1.65	$1.50
50	2.75	2.50	....	140	1.60	1.50	1.40
75	2.50	2.30	....	150	1.50	1.45	1.35
100	2.15	2.00	....	160	1.45	1.40	1.30

CUPRAMMONIUM PROCESS

Denier	Filaments	Price	Denier	Filaments	Price
40	30	$4.50	150	112	$2.40
60	45	3.75	180	135	2.30
80	60	3.50	240	180	2.25
100	75	3.25	300	225	2.25
120	90	2.90			

ACETATE PROCESS

Denier	Price	Denier	Price
45	$3.00	120	$2.30
55	3.00	150	1.90
75	2.55	200	1.90
100	2.40	300	2.20

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RAYON

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Rayon and Silk Yarns—Continued

all the bank debts of the company itself and of its subsidiaries to be repaid. Owing to the agreement entered into with Glanzstoff and Courtaulds, the company is now beginning to feel the benefit of the technical advice obtained. The quality of the silk is improving and as soon as the modifications which are taking place at the different plants are completed, very substantial benefits are expected. The present production is 100,000 lbs. daily. Stocks have been increasing slightly on account of some bad markets but sales have been keeping up very well and profits are normal. The rumor that another capital reduction is contemplated is denied.

AUSTRIA

The Erste Osterr. Glanzstoff Fabrik A. G. of St. Pölten has recently increased its capital from 9 to 16 million Austrian schillings. It is intended to double the present production.

* * *

The process worked by Gebruder Bader of Vienna and Mahr-Chrostau, which is being worked in England by the Yorkshire Artificial Silk Co., is now to be employed in Germany and Japan.

HOLLAND

Exports of rayon yarn from Holland in the first half of the current year amounted to 7,867,200 lbs. against 7,816,600 lbs. in the corresponding period of 1927.

* * *

French capital will be concerned in the proposed erection of a rayon plant under the style of "N. V. Kunsteijde Fabriek Roosendaal" at Roosendaal in Holland. The Banque de Paris et des Pays Bas and the Banque de l'Union Parisienne are behind this plan, the final realization of which depends upon a loan by the municipality of Roosendaal. The latter has been requested to advance one million guldens, free of interest, to the undertaking. The French, Belgian and Dutch capitalists are prepared to put up two million guldens.

Raw Silk Conference in 1929

Japanese Interests Invited to U. S. for Work on Classification

Recommendation that an invitation be extended to Japan to attend a Second Japanese-American Scientific Conference to be held in New York in 1929 for the purpose of securing accord and official approval of an international raw silk classification, was made by the American Technical Committee on Sept. 19 in a report of recent technical conferences in Japan submitted to the Board of Managers of the Silk Association of America, Inc. The report was read and accepted at the quarterly meeting of the Board of Managers held Sept. 19 at the rooms of the Silk Association and presided over by H. Schniewind, Jr., president of the association.

That upon numerous items of raw silk classification both America and Japan are in accord and that these items be formulated and given recognition as standards by some type of official action is the suggestion of the American Technical Committee, who visited Japan for the purpose of explaining needs of American silk manufacturers and demonstrating the raw silk classification system compiled by the Silk Association. To this end it is suggested that an invitation be extended to the Raw Silk Association of Japan, the Exporters' Association of Yokohama and Kobe and the proper Government departments, to visit this country in the interest of an international raw silk classification.

Other business transacted at the meeting included the adoption of the woven label rules, and revised thrown silk rules, compiled and presented by the Woven Label Division and the Thrown Silk Dealers' Division, respectively.

The following firms were elected to membership in the Association:—Associated Dyeing & Printing Corp; J. S. Bache & Co., commission merchants; Combier & Co., Inc., silk manufacturers and importers; Henry P. Heitman, Inc., raw and thrown silks; Hertz & Morgan Silk Co., broad silk manufacturers; Fuki Shokai, importers; Strenge Dye Works, Inc., finishers, dyers and weighters; Sulzbacher, Granger & Co., brokers; Tokisawa & Co., import of Japan raw silk; Wade Bros. & Co., general commission brokerage.

Raw Silk Stronger

Market Gains at Opening of Week and Is Firm

The primary market in raw silks has been both active and strong up to the time of going to press and prices have on the average advanced 5c a pound over last week.

The first two days of the week were marked by the bullish trend on the floor of the Exchange and buying was heavy to cover short sales of last week.

Prices are quoted as an average from New York importers and are as follows:

(60 day basis)

Japan filature, grand XX, 13/15	$5.40
Japan filature, sp. crack, 13/15	5.15
Japan filature, crack XX, 13/15	5.05
Japan filature, XX, 13/15	4.95
Japan filature, best X, 13/15	4.85
Japan filature, X, 13/15	4.70
Canton filature, new style, 14/16	4.15
Canton filature, new style, 20/22	3.95
Tussah filature, 8 cocoon	2.30
Grand XX, (Yellow) 20/22	4.80
Grand XX, (White) 20/22	5.00
Sp. crack (Yellow) 20/22	4.75
Sp. crack (White) 20/22	4.85
Crack (Yellow) 20/22	4.65
Crack (White) 20/22	4.75

National Raw Silk Exchange Prices Are as Follows:

	Close Sept. 12	For the Week High	Low	Close Sept. 18	Net Change
October	4.89–.92	4.99	4.85	4.97–.99	+.07
November	4.90–.91	4.99	4.84	4.97–.99	+.08
December	4.90	5.03	4.85	5.00–.01	+.11
January	4.91–.92	5.03	4.86	5.00	+.08
February	4.89–.92	5.02	4.85	5.00–.01	+.09
March	4.90–.92	5.01	4.86	4.99–5.01	+.09
April	4.88–.91	5.00	4.85	4.98–5.00	+.09
Total Contracts Sold Sept. 11–18			In bales 2,885		Approx. value $2,819,425

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FIGURES THAT NEED NO COMMENT:

(From a leading Textile Journal)

Estimated Production of Viscose Rayon During 1927:

Country	lbs.
U. S.	75,000,000
Britain	40,000,000
Belgium	6,700,000
Germany	23,400,000
France	20,900,000
Italy	41,000,000
NETHERLANDS	18,600,000
Poland	3,200,000
Hungary	300,000

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Manufacturers of
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CHELSEA, MASS.

WOOL AND SUBSTITUTES

Irregular Market For Substitutes

Mill Demand for All Kinds in Limited Volume—Rag Graders' Position Uncertain

BOSTON.—The wool substitute market is generally quiet but steady. Additional business in small volume is coming into reworked wool manufacturers. Buying ahead of processed fibers is however in small compass and this results in spotty buying of needed rags from the graders. The clip market is more active than previously. Mills are usually relatively large buyers of the unused material purchasing their "shoddy" from the manufacturers equipped by modern machinery to handle scientifically and satisfactorily the great variety of old rags available.

The old woolen rag market is in a very sluggish condition. Some rags of course are selling all the time and among them may be mentioned the several colored knits, also a little white knit. Light hoods, fine light merinos, blue worsteds and blue serges are in very slow demand. The price situation continues very unsatisfactory. The rag grader is caught between low prices named by the consumer and high prices demanded by the packers of mixed rags.

The Dewsbury rag market is still very depressed in sentiment and the outlook seems far from bright. The same complaint of high values on mixed rags is heard and its complimentary complaint that prices on graded sorts are too low. Well-sorted rags remain generally firm but other materials are moving in the buyer's favor.

Wool wastes are not doing any rushing business but dealers report an increased interest on the part of the mills who however continue to press for lower values. Stocks of wastes are not in sufficient abundance to allow any depression in prices. The output of spinning wastes has been well below normal this year, much smaller than last year at this time. It has, however, to be noted that increased business now being received by worsted manufacturers which is confirmed by larger purchasing of fine wools will in the near future result in a larger output of white worsted wastes of the several descriptions. Colored fine lap is very firm with a demand exceeding the supply. Some shading of prices is reported in fine worsted threads but stocks held by dealers are so relatively small that any decline in price could speedily be checked. Fine white worsted card waste, either thoroughly willowed or else carbonized, is in moderate demand, the undusted around 55-58c.

Wool Situation Basally Sound

Wool Houses Hold Conservative Optimism Believing Their Stocks Not Over Adequate

Boston.

SENTIMENT in the wool district is inclined to be optimistic. The basal situation for domestic wools is considered very satisfactory and those houses who made contracts earlier in the season are able to sell on current market at fair profits. The entire situation is considered very liquid. There are no large stocks in the hands of manufacturers and they are well able to take on additional supplies without financial strain. A steady, firm and gradually expanding market is the outlook for the next few weeks.

Dealers appear encouraged over the outlook. Mill demand at this time is running rather strongly to the ungraded wools from the territory States which are all selling in the original bags at very firm prices. Fleece wools of the medium quality are also moving much more briskly with a rising price tendency seen on the ⅜ and ¼ blood grades. The Ohio ¼ blood is now very firm at 54c in the grease and ⅜ blood at 55c. Some of the ½ blood Ohio combing wool has been taken by one or two manufacturers at 51c. The ½ blood territory strictly combing wools are very firm and in larger demand from topmakers.

The purchasing of fine wools in the local market during the last week or ten days has been by manufacturers who carry wool through all its operations rather than by topmaking concerns. Attention is again called to the fact that prices on fine, ½ blood and high ⅜ blood tops are unusually and abnormally close together. It is a question said a topmaker whether we are to consider fine tops as too low-priced or the ½ blood and ⅜ blood too high priced. In view of the unusual situation and the firmer position held by fine wools at this time it is altogether likely that the stretch between the price of ½ blood and ⅜ blood on the one hand and the fine tops on the other will be widened by an advance in the fine tops.

In wools for the woolen branch of manufacturing business is rather irregular but there is a fair demand for the finer types of scoured wool. The pulled wools are less active than they were and are on a slightly lower level. The relatively small amount of pulled wool produced in the U. S. allows prices on the several grades to be manipulated more or less by the wool pullers. The B pulled wool, however, is firm and it is of interest to note that there arrived from New Zealand during the week 340 bales of pulled wool.

As noted recently the arrival of domestic wool into Boston this year, practically the same amount as last year, has not apparently moved out of the city to consumers with the same freedom as a year ago. Shipping statistics are approximate only, the only figures available being deliveries out of the city by land and by sea. On this basis about 25,000,000 lbs. less wool have been shipped. Most wool houses in commenting on the situation take the position that there have been steadier and larger deliveries by motor truck and that if the figures were available the combined total by rail and by motor truck would be fully equal to last year.

Wool and Substitute Quotations

(Corrected at close of business on Wednesday)

WOOL

Ohio, Pennsylvania and West Virginia

Fine delaine	.48—.49
Fine clothing	.39—.40
½ blood	.50—.51
⅜ blood	.54—.55
¼ blood	.54—.55

California (Scoured Basis)

Northern, 12 mo.	1.08—1.10
Southern, 12 mo.	.95—.97

Texas (Scoured Basis)

Fine 12 mo.	1.12—1.15
Fine 8 mo.	1.00—1.05

Pulled—Eastern (Scoured Basis)

A-A	1.10—1.12
A-Super	1.05—1.07
B-Super	.98—1.05
C-Super	.88—.90

Montana, Idaho and Wyoming (Scoured Basis)

Staple fine	1.12—1.15
Do. ½ bld.	1.08—1.10
Fine & fine medium	1.08—1.10
⅜ blood	1.02—1.05
¼ blood	.95—.98

Mohair—Domestic

Best carding	.55—.60
Best combing	.85—.88

Mohair—Foreign (In Bond)

Turkey Fair average	.47—.52
Cape Firsts	.48—.50

Foreign Clothing and Combing (In Bond)

Scoured Basis—

Canadian:	
Alberta F & F medium	1.10—1.12
Cape: Nominal	
Super 12 months	1.03—1.05
Super 10-12 months	.98—1.00
Australian: Nominal	
70s	1.10—1.15
64s	.98—1.02
58—60s	.90—.92
Grease Basis—	
Montevideo: Nominal	
58-60s	.54—.55
56s	.52—.53
50s	.50—51
Buenos Aires: Nominal	
4s, 40—44s	.37—.38
5s, 36—40s	.35—.36

Foreign Carpet (Grease Basis in Bond)

China: Combing No. 1	.27—.28
China Filling Fleece	.24—.25
Szechuen ass't	.27—.28
Cordova	.24—.25
Scotch Black Face	.27—.28
East India: Kandahar	.38—.40
Vican'r	.42—.44
Joria	.42—.44
Aleppo	.37—.38

SUBSTITUTES

Wool Waste

Lap—	
Fine white	1.23—1.26
Fine colored	1.05—1.08
Thread White Worsted—	
Fine	.90—.93
½ blood	.83—.85
⅜ blood	.73—.75
¼ blood	.63—.65
Thread Colored Worsted—	
Fine Two-ply	.42—.45
½ blood, Two-ply	.38—.40
⅜ blood, Two-ply	.35—.37
¼ blood, Two-ply	.28—.32
Card—	
Fine white	.53—.57
Medium white	.35—.37

Old Woolen Rags (Graded for Mfrs.)

Merinos—	
Coarse light	7—8
Fine dark	8—8½
Fine light	15—16
Serges—	
Blue	8—9
Black	9—9½
Red	15—16
Knits—	
White	.41—.42
Red	.16—.17
Light hoods	.21—.22
Worsteds—	
Light	7½—8
Blue	8—9
Black	9½—10

London Sales Open Lower

Technical Reaction Deflates High Spot Wool Values

The fifth series of London wool auctions opened Tuesday on a much lower level. Wools both merinos and crossbreds were 5-10% lower than the closing prices of the previous sale. This decline in value, however, has done little less than bring London prices nearer parity with Australian values for similar wools. Much of the wool offered at the sale was by Bradford holders and if the prices they set were not reached the wool was withdrawn, a procedure which brought about rather heavy withdrawals. There was good interest shown in the sale with the Continent buyers of the crossbreds. A lower opening was the general expectation of Summer Street and was also the desire of English manufacturers although not quite to the liking of Bradford wool importers.

A large amount of wool was reoffered by Yorkshire holders. Direct importers have had many difficulties to contend with in disposing of wool purchases near the close of the last selling season in Australia and although it is generally believed that stocks are not unduly heavy they are certainly large enough in view of the restricted consumption in the English mills and in face of the opening of the new world season. American buying is likely to be very light although if prices should decline during the series it is possible that there may be some purchasing of the crossbred wools.

Trade in wools on Summer Street is shown further expansion. The wool

A Popular Warp Dyer

Warp dyeing requirements are most exacting. Nobody knows this better than the makers of the Reliance Warp Dyeing Machine. The result is a machine that rates high. We shall gladly supply further particulars.

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Hedge and Plum Sts., Frankford, Phila., Pa.

Creo-pine
Trade Mark Reg.
Sub Flooring
Lay Once
never replace

Sales Offices
in Principal Cities
New York, Philadelphia, Pittsburgh, Toledo, Cleveland, Charlotte
See also CONSOLIDATED TEXTILE CATALOG
Southern Wood Preserving Co.
Atlanta, Ga.

THE JOHNSON FRICTION CLUTCH.
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FRICTION CLUTCHES
FOR BUTTON-BREAKERS

Single Clutch with Pulley

A splendid clutch for Button-Breakers is the JOHNSON. On these machines and various other machines these clutches are highly satisfactory. Small, compact clutches, especially adapted for light-power machines. Little space. Great strength. Maximum performance. Equip with JOHNSONS.

Write for Violet Catalog

See also CONSOLIDATED TEXTILE CATALOG

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

IT IS THE SIMPLEST HEAD MADE
THERE ARE NO MOVING PARTS
LOW PRESSURE AUTOMATIC 15 LBS. REQUIRES LESS POWER THAN ANY HEAD HAVING EITHER AIR OR WATER PRESSURE
WILL NOT CLOG
THIS HEAD WILL VAPORIZE 5 GALS. WATER (42 LBS.) PER HOUR AND REQUIRES ONLY ½ H.P. TO DO THE WORK.

HUMIDIFYING SYSTEMS
with
SELF-RECORDING AUTOMATIC CONTROL
Low Operating Cost High Efficiency
MODERATE PRICE
Rhode Island Humidifier & Ventilating Co.
EST. 1908 99 Chauncy St., Dept. TW, Boston, Mass.

TRADE U.S. RING TRAVELER CO. MARK

The "Bowen Specially Tempered Narrow Travelers" for Fine Yarns
The "Bowen Patented Vertical Offset Traveler" for Uniformity of Twist in Cords and Plys
Manufactured only by the
U. S. RING TRAVELER COMPANY, Providence, R. I.
SOUTHERN OFFICE: Greenville, S. C., P. O. Box 792
Antonio Spencer, *President* Amos M. Bowen, *Treasurer*
— UNIVERSAL STANDARD PRODUCTS —

—SPECIFY—
The Palmer Improved Adjustable Thread Guides
on your Spinning and Twisting Frames.
The I. E. Palmer Co.
Middletown, Conn.

The Simplicity Assures Easy Adjustment and Rigid Setting

BARBER-COLMAN COMPANY
General Offices and Plant
Rockford, Ill., U.S.A.
Framingham, Mass.
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Knotters
Warp Tying Machines
Warp Drawing Machines
Automatic Spoolers
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ENGINEERS -:- FOUNDERS -:- MACHINISTS
PROVIDENCE, R. I.
Manufacturers of Transmission Machinery, Spun Silk Machinery, French Worsted Drawing Frames (Frotteurs), Ball Winding Machines, Shoe Lace Tipping Machines, Yarn Dressers, Wool Top Baling Presses, Yarn Baling Presses, Special Textile Machinery, Corliss Steam Engines, Worm Gears and Worm Gear Reduction Units.
TEXTILE PRINTING MACHINERY
Machinery for Dyeing Rayon in the Skein

TRADE MARK REG. U. S. P. O.

WENTWORTH
Double Duty Travelers
Last Longer, Make Stronger Yarn, Run Clear. Preserve the SPINNING RING. The greatest improvement entering the Spinning room since the advent of the HIGH SPEED SPINDLE.
Manufactured only by the
National Ring Traveler Co.
Providence, R. I.
31 W. 1st St., Charlotte, N. C.

A Woolford Dye Tub is always a High Class Tub.

Lined with Monel or constructed with All Acid Resisting Rods if desired.

See also CONSOLIDATED TEXTILE CATALOG

G. WOOLFORD WOOD TANK MFG. CO.
Factory: Darby, Pa. Mail Address Paschall P. O., Philadelphia, Pa.

Wool—Continued

trade believes itself to be in a very sound position and although stocks of fine wool seem fully adequate at this time to the mill demand, medium wools on the other hand are in relatively small compass and as the demand is improving higher prices on these wools are not unlikely to be seen. The amount of ¼ blood wool for example produced in the U. S. is relatively small and the high values of foreign crossbreds has prevented and is likely to prevent for some time to come any importing in volume.

There seems to be a very strong demand for ½ blood wools on Summer Street and graders are behind in making deliveries. A similar situation is developing also in ¼ blood domestic wool. Fine wools however remain relatively inactive. Montana ½ blood is quoted $1.08-$1.10 and Utah and Idaho $1.05-$1.08. The Ohio medium wools are said to be out of the hands of the original holders. Nothing has yet been accomplished in contracting the fall Texas clip where shearing will commence about the beginning of October. This year's fall clip is estimated at around 7,000,000 lbs. and so far as it is known growers are likely to name as an opening price around 35c.

Boston Wool Receipts

Receipts of domestic and foreign wools at Boston, also imports at Philadelphia and New York, for the week ended Sept. 15, based upon data compiled by the Market News Service of Bureau of Agricultural Economics, Department of Agriculture, are as follows:

	Week Ended Sept. 15	1928	1927
Domestic	3,113,000	184,504,000	183,600,000
Foreign	755,000	74,468,000	95,880,000
Total	3,868,000	258,972,000	279,480,000
IMPORTS AT PRINCIPAL PORTS			
Boston	755,000	74,468,000	95,880,000
Philadelphia ..	1,286,000	49,778,000	54,134,000
New York.....	1,053,000	47,626,000	42,717,000
Total	3,094,000	171,872,000	192,731,000

Carpet Wool More Active

Territory Displays Marked Improvement—Woolen Wools Quiet

PHILADELPHIA.—The outstanding feature of the market during the last two weeks has been the decided improvement in demand for carpet wools. Carpet manufacturers in this section have been out of the market for a number of months and dealers handling wools of this type have been wondering if betterment was coming this year. During the last two weeks local manufacturers have booked new business in sizeable quantities and have been buying wools to cover these goods orders. Dealers have sold more wool and there has been a strengthening of prices although quotations are not changed. Stocks held by local dealers are below normal and as manufacturers want immediate delivery a fairly strong spot situation is developing.

East India Auctions

Liverpool auctions closed last week with prices unchanged but strong and dealers here are quoting Vicaneers at slightly higher figures, now asking 42c to 44c for these sorts. Foreign markets continue strong and dealers are unable to replenish their stocks and sell at prices domestic manufacturers are paying for similar wools. As a result many dealers have allowed stocks to become small and now that demand is improving they are unable to supply manufacturers with spot wools in many instances. Demand at present is largely confined to spot wools and when a dealer does not have the wool the sale is lost. One of the largest carpet mills in the city states they have booked a larger volume of business within the last three weeks than for many months.

How far this expansion of demand will carry is debatable, a number believing it represents merely a filling-in business from manufacturers who have been out of the wool market long as possible and that demand will not continue to expand. Others feel fall buying of carpet wools will continue during the next two months or more and the most active trading of the present year will be seen with domestic prices becoming firmer in accordance with strength in primary carpet wool markets. Dealers assert that if they sell they must pay proportionately higher prices abroad, when they seek to replenish stocks.

Grease Wools Selling

Expansion in demand and slightly firmer prices are evident in territory wools, dealers reporting a larger number of inquiries and sales than for several weeks. While demand has been scattered in all grades interest in half blood and fine is especially impressive. Fair sized lines of average fine wools have been reported sold at $1.07 while half blood staple has been moved at $1.10. There have been more mill buyers in the market than for two months during the last ten days, among them being one of the largest concerns in the country which is reported to have bought large quantities in this city and other markets during this time.

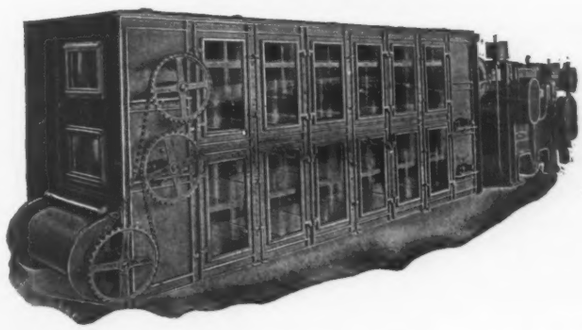
Large sales by local dealers to this manufacturer are regarded as important in a number of respects. This firm is usually one of the most successful buyers, having a reputation of buying at the lowest points and the fact they have chosen this particular time to come into the market for important sized lines is regarded as particularly significant.

Spotty Fleece Interest

Fleece wools have taken part in this movement and while sales are not appreciably larger there have been more inquiries. Dealers are holding these wools more firmly than three weeks ago and sales of average bright quarters have been noted at 52c to 53c, comparing with sales a month ago at 51c or slightly lower for the same type of wool. Three eighths fleece

(*Continued on page 99*)

The Sargent Backwasher and Backwash Dryer



These machines are used for plain or vigoureux work. The Backwash Dryer may be connected with your present Backwasher. They are running so connected with practically all makes of Backwashers.

All of the custom combers in this country, but six, operate this Dryer. It is used by many worsted spinners.

The principle of its operation is different from all other makes. The injurious effects on the wool of hot metal contact is avoided, the drying being effected by gentle currents of warm air. Quality is improved and capacity increased.

No threading of ends necessary. No breaking down of ends. The annoyance of operation reduced to a minimum. Quality of results raised to the highest point.

Ask any comber or carder his opinion of this machine.

Send for catalog Number 132.

See also CONSOLIDATED TEXTILE CATALOG

C. G. SARGENT'S SONS CORP., Graniteville, Mass.

Builders of Wool Washing and Drying Machines

CHAS. A. SCHIEREN COMPANY

ESTABLISHED 1868

DUXBAK➡DUXBAK➡DUXBAK➡DUXBAK➡DUXBAK

DUXBAK *Leather* BELTS

THE MOST PLIABLE OAK-TANNED BELT

10,000 PLANTS BUY IT

10,000 plants buy a belt
That bears the outline of
A little duck, in silver,
Because they know this
Mark signifies a good
Belt and if they continue
To buy this belt with the
Silver duck they will
Continue to get
Dependable service.

Do you buy belts by brand?

Send for These Pamphlets: "The Seven Factors of Belting Economy"

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Please put my name on your mailing list to receive "THE SEVEN FACTORS OF BELTING ECONOMY" as they are published.

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For Identical Results—Always

All Diamond Alkalies are made to give identical results from one end of the year to the other. The Diamond Alkali you use today will give the same chemical reaction—will have the same purity and the same uniformity as the Diamond Alkali you purchase a year from now.

Diamond Alkalies Include

58% Soda Ash	76% Caustic Soda
Bicarbonate of Soda	Laundry Soda
Cleaner and Cleanser	Special Alkali

Diamond Alkali Company

Pittsburgh, Pa. *and Everywhere*

ALKALI

DYESTUFFS AND CHEMICALS

Argentina a Promising Market for American Dyes

The dye market in the Argentine Republic is probably one of the most competitive in the world. Prior to the World War, Germany dominated the Argentine dye market but to-day the United States' dyes are firmly established and imports into Argentina from the United States account for more than a third of the total imports. During the first six months of 1927, these amounted to 172,198 kilos, valued at 253,957 Argentine gold pesos, states Commercial Attache Alexander V. Dye, Buenos Aires. The following table gives the official figures for imports by countries during the year 1926:

Dyes Imported into Argentina in 1926

Country of origin	Kilos	Gold Pesos
Germany	160,440	229,203
United States	149,857	206,161
Switzerland	52,728	73,758
Italy	25,031	36,301
Netherland	8,361	12,478
France	4,718	7,043
United Kingdom	1,627	2,046
Uruguay	1,192	1,853
Chile	963	1,298
Sweden	670	970
Japan	383	613
Bolivia	172	273
Spain	26	42
Brazil	9	15
Total	406,177	572,051

(The average value of the Argentine gold peso in 1926 was $0.9215 and in 1927, $0.9630 United States currency.)

Piedmont Print Works, Taylors, S. C., is installing equipment and will be ready for operation in a few weeks. J. E. Sirrine & Co., Greenville, S. C., are the engineers.

Dye Division of A. C. S. Meets

Holds Sessions at Swampscott in Conjunction with Society's Meeting

IN conjunction with the 75th meeting of the American Chemical Society at Swampscott, Mass., last week, the Division of Dye Chemistry held three sessions. Dr. M. L. Crossley, chairman of the division, presided.

In addition to the papers which have been referred to previously in these columns, several others of interest to textile and dye chemists were presented. A few of these are abstracted below:

Early Documentary References on the Use of Dyestuffs in America. C. A. Browne:—A brief history of the use of colors by the Puritans and their successors in New England, including dyes imported from Europe and those obtained from the Indians. The story concludes with the introduction of fuchsine, the first coal-tar dye used to any considerable extent in the United States.

Color Specification. Material, Physical, and Psychological. Walter M. Scott, Muncell Color Co., Inc.: The evolution of color understanding is traced through the earlier primitive conceptions of color up to the present modern conceptions. The earliest colorists derived their theories of color from the mixture of colored materials such as pigments or dyestuffs. Later, with the growth of post-Newtonian science, there arose a great interest in regard to those excitable elements which existed in the retina, by whose action color nerve currents were sent to the brain. This led to the formulation of a number of theories based on color excitations. With the development of research on the spectrum, the close relationship of color to light was discovered. This led to the development of color specification on the basis of spectral reflection curves. Finally, with the birth of psychology, scientists began to see that there were complicated processes in the brain which could be observed directly in our minds as sensations. A careful study of color sensations led to the inevitable conclusion that color had three dimensions. The modern specification of color is therefore based on the sensation color solid.

Absorption Spectra and the Constitution of the Phthaleins — A Study of the Trihydroxy Phenols. C. V. Shapiro and R. C. Gibbs, Cornell University:—Measurements on the absorption spectra of phthaleins of pyrogallol, hydroxyhydroquinol, and phloroglucinol in neutral, acid, and alkaline solution are reported. The effect of varying the positions of the hydroxyl groups is very marked, both on the absorption spectra of the individual compounds and on those chemical properties which may be deduced from a comparative study of all the spectra. The relation of the above compounds to the mono- and di-hydroxy derivatives previously studied is pointed out. A point of peculiar interest in the light of the quinoid theory of color production is the fact that gallein, a colored compound, shows a pair of bands which have previously been found to be characteristic only of the colorless, lactoid phthaleins. These bands do not occur in the absorption spectra of related compounds, such as the fluoresceins and sulfonephthaleins, which definitely possess the quinoid structure. Hydroxyhydroquinolphthalein behaves anomalously when gradually increasing amounts of alkali are added to its neutral solution, for the visual absorption band shifts continuously toward the red and simultaneously changes in character, while its intensity passes through a maximum for intermediate concentrations of alkali.

Spectrophotometry and Dyeing. Wm. D. Appel and R. T. Mease:—In the final anaylsis, the value of a dye depends on the color, or spectral reflection, of the material to which it has been applied. Spectrophotometric reflection measurements give a quantitative record of the color and can be used to advantage in testing dyes, in the study and control of dyeing operations, and in determining the fastness of dyed materials. Illustrative measurements made with relatively inexpensive apparatus are given.

Spectrophotometric Evaluation of Dyestuffs. R. W. French, Army Medical Museum:—For greater accuracy and convenience a method for the evaluation of mixtures of dyestuffs is proposed through a combination of the titanous chloride consumption and spectrophotometric findings. To make the method of practical value the determination of spe-

Miscellaneous Chemicals

Aluminum Sulp. com.	1 40	—	1 60
Iron Free	2 00	—	2 05
Alum, Ammonia Lmp.	3¼	—	3½
Potash, Lump	3	—	3⅛
Ammoniac, Sal. white gr., dom.	4¾	—	5
Bleach powder, per 100 lb. works	2 00	—	2 60
Blue Stone	5½	—	6
Chlorine, Liq. Cylinders	5½	—	9
Tanks	3½	—	3¾
Copperas, ton	13 00	—	18 00
Cream of Tartar	26½	—	28
Epsom Salts, 100 lb.	1 75	—	1 90
Formaldehyde Spot	8	—	8½
Glauber Salts, 100 lb.	75	—	1 15
Glycerine (C. P.) bbls.	15	—	15½
Cans	16½	—	17
Yellow Crude	14½	—	15
Hydrosulphite Conc.	23	—	25
Lead—Brown acetate	12	—	12½
White (crystals)	13	—	14
Lime, acetate, 100 lb.	3 50	—	....
Potassium—Bichromate	8¾	—	9
Chlorate crystals	8	—	9
Permangan, tech	15	—	16
Sodium acetate	5½	—	6
Bichromate	7	—	7¼
Bisulphite, 35%	1 50	—	1 75
Nitrite	7½	—	8¾
Phosphate	3¼	—	4
Prussiate, yellow	11	—	12
Sulphide, 60% fused	3¾	—	4
30% crystals	2¼	—	2⅝
Tartar emetic, tech	27½	—	....
Tin—Crystals	36½	—	....
Bichloride, 50 deg.	14½	—	....
Oxide, bbls.	53	—	....
Zinc Dust	9	—	11

Acids

Acetic, 28% per 100 lb.	3 37½	—	3 62½
Citric crystals	46	—	47
Fermic, 90%	11	—	12
Lactic, 22%	5	—	6¼
Muriatic, 18 deg. per 100 lb. in tank cars	1 00	—	....
Nitric, 36@42 deg. per 100 lb.	5 00	—	6 75
Oxalic	11	—	12¼
Sulphuric, 66 deg. per ton in tank cars	15 50	—	....
Tartaric	38	—	39

Alkalies

Ammonia, Aqua, 26 deg.	2½	—	3½
Borax, Crys. bbls.	3	—	....
Potash, carbonate, 80–85%	5½	—	6½
Caustic, 88–92%	7⅛	—	7½
Soda Ash, 58% light	1 37	—	2 44
Contract, 100 lb.	1 32	—	1 55
Bicarb. per 100 lbs.	2.00	—	2 50
Caustic, 76% per 100 lb.	4 15	—	4 30
Contract, 100 lb.	3 30	—	....
Sal. 100 lb.	1 00	—	1 25

Natural Dyes and Tannins

Fustic: Crystals	18	—	22
Liquid, 51 deg.	8	—	10
Gambier, liquid	8	—	10
Hematine, crystals	14	—	18
Hypernic Ext.—51 deg.	11	—	15
Indigo—Madras	1 30	—	....
Logwood Extract, liq. 51 deg.	7	—	8½
Crystals	14	—	18
Osage Orange, Extract, 51 deg.	7	—	7¼
Quercitron extract, 51 deg.	5½	—	6
Sumac, Ext. dom., ref., 51 deg.	5½	—	6½
Extract, stainless	10	—	11
Tannic Acid, tech.	35	—	40

Dyestuffs and Intermediaries

Alpha Napthylamine	32	—	34
Aniline Oil	15	—	16¼
Salt	24	—	25
Beta Naphthol sublimed	55	—	60
Technical	22	—	24
Dimethylaniline	30	—	32
Metaphenylene Diamine	84	—	....
Paranitraniline	52	—	53

Oils and Soaps

Castor Oil, No. 3	13	—	14½
Olive Oil, denatured, gal.	1 25	—	1 40
Foots	10½	—	....
Red Oil, lb.	9	—	10½
Stearic Acid double pressed	12	—	12¾
Turkey Red Oil, 50%	9	—	11

Adhesive and Sizing Materials

Albumen, blood domestic	43	—	50
Dextrine-Potato	8	—	9
Corn, bags 100 lb.	4 92	—	5 12
Gum, British, 100 lb.	5 17	—	5 37
Sago flour	4½	—	5½
Starch, corn, 100 lb.	4 12	—	4 32
Potato	6	—	6½
Rice	9	—	10
Wheat	6½	—	10
Tapioca flour	3½	—	5½

Coal Tar Dyes

Direct Colors—			
Black (H-acid)	28	—	52
Black Columbia FF.	50	—	60
Blue, 2 B.	24	—	32
Blue Sky, ordinary	45	—	90
Blue, 2 GL.	1 70	—	2 50
Blue, 4 GL.	1 60	—	....
Blue Sky, FF.	60	—	1 20
Blue, Fast RL.	1 90	—	....
Blue, Solamine	2 00	—	....
Benzo Azurine	90	—	80
Brown, C.	40	—	60
Brown, M.	70	—	90
Brown, Congo G.	85	—	....
Brown, Congo R.	80	—	....
Green, B.	60	—	90
Green, G.	65	—	90
Orange, Congo	60	—	....
Orange, Fast S.	1 80	—	....
Red, Fast F.	80	—	90
Red, Congo	40	—	50
Benzo Purpurine, 4 B.	40	—	60
Benzo Purpurine, 10 B.	1 25	—	1 50
Scarlet, 4 BA.	1 50	—	....
Scarlet, 4 BS.	1 45	—	....
Scarlet, 8 BS.	1 25	—	....
Scarlet, Diamine B.	1 65	—	....
Violet N.	1 10	—	1 20
Yellow chrysophenine	50	—	1 50
Yellow, Stilbene	90	—	95
Developing Colors—			
Black, BH	40	—	60
Black Zambesi	....	—	90
Bordeaux, Dev.	2 00	—	....
Orange, developed	2 50	—	....
Primuline	1 00	—	1 15
Red, Dev. 7 BL.	2 50	—	....
Scarlet, Dev.	2 50	—	....
Sulphur Colors—			
Black	20	—	31
Blue, cadet	90	—	95
Blue, Navy	50	—	60
Brown	37	—	60
Green	85	—	1 50
Green, olive	25	—	50
Yellow	45	—	1 40
Basic Colors—			
Auramine	90	—	1 30
Bismark Brown	50	—	60
Chrysoidine	40	—	65
Fuschine crystals	1 50	—	1 75
Malachite green	1 35	—	....
Methylene blue	1 00	—	1 40
Methyl violet	90	—	1 15
Rhodamine B, excone	5 00	—	6 00
Safranine	1 45	—	1 60
Victoria Blue B.	3 10	—	....
Acid Colors—			
Naphthol blue blk.	47	—	60
Napthlamine black, 4 B.	50	—	55
Alizarine saphirol	2 35	—	4 00
Alkali blue	3 25	—	3 50
Indigotine	80	—	1 30
Induline (water soluble)	75	—	80
Soluble Blue	3 00	—	3 75
Sulphoneyanine	1 00	—	....
Sulphone Blue R.	60	—	95
Patent Blue A.	2 50	—	....
Rescorcin brown	80	—	90
Guinea green	1 00	—	2 20
Wool green S	84	—	1 70
Orange II	27	—	....
Orange GG crys.	60	—	....
Acid Fuchsine	80	—	90
Azo eosine G	65	—	82
Croccin scarlet	1 15	—	1 90
Fast red A.	50	—	65
Azo yellow	1.35	—	1 40
F. Light Yellow, 2 G.	1 40	—	....
F. Light Yellow, 3 G.	1 50	—	....
Naphthol, yellow	1 35	—	1 40
Chrome Colors—			
Aliz, Black B.	1 80	—	....
Diamond Black PV.	70	—	....
Chrome Blue Black.	45	—	....
Chrome Brown	60	—	1 80
Chrome Green	75	—	1 50
Chrome Yellow	45	—	1 10
Indigo—			
Synthetic 20% paste	15	—	17

Now You Can Size Your Warps with Less Breakage

ADD Victrolyn to your size bath. Let this modern lubricant keep your warps running smoothly, easily . . . and with so much *less* breakage. For Victrolyn proves more satisfactory for this work than tallow. It penetrates more quickly . . . mixes with the size more readily, more uniformly. And you can bank on cleaner work . . .

Victrolyn is an economical oil to use. It's almost completely free of water when you buy it. And you need mix but 5 pounds to every 300 gallons of size.

A test of Victrolyn in your own slashers will prove more than a page of claims. Let us send you a 10 gallon can for trial. If it should prove unsatisfactory, return the unused portion at our expense. *Write.*

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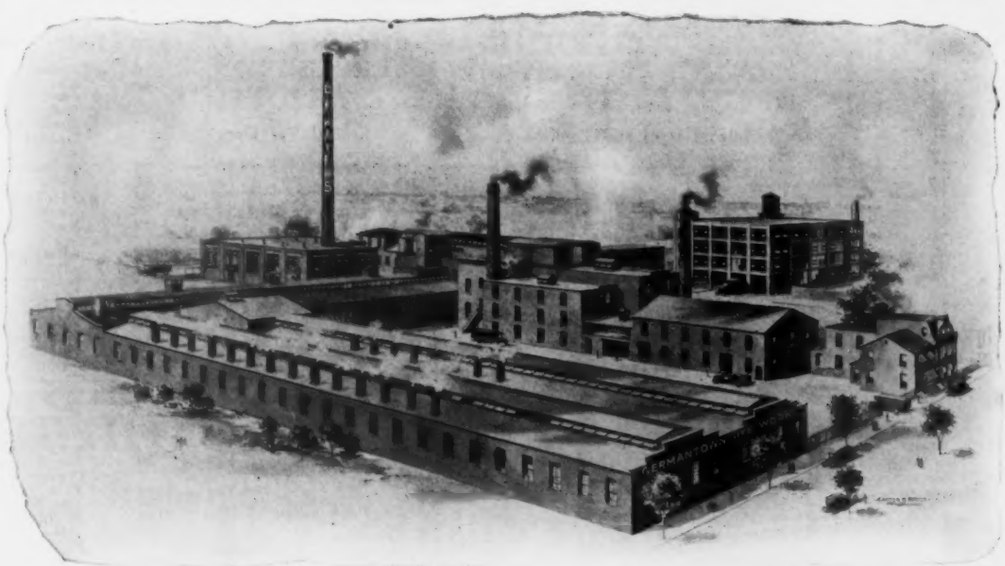

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SILK COTTON and WOOLEN HOSIERY

We also SPECIALIZE in CUT WORK for WILTON and ORIENTAL RUGS

GERMANTOWN DYE WORKS

Dyes and Chemicals—Continued

cific absorption values is necessary, and to make the values of specific application solvent effect is taken into consideration, or special solvents such as 50 per cent alcohol used. With the spectrophotometric and titanous chloride constants available, it is practicable to use a simplified formula in the evaluation of dye mixtures as the observed values substitute only in the numerators of two fractions.

Bellman Brook Bleachery Adds Printing Facilities to Finishing Plant

The Bellman Brook Bleachery, Fairview, N. J., specializing in the finishing of voiles, organdies, bastistes, lawns, dimities, and sheer rayon fabrics, announce that, to further serve the interest of the converting trade, they will have established, ready for operation by Oct. 15, three six-color machines and one eight-color machine for printing.

All the printing equipment will be of the most modern type and will be under the expert supervision of a skilled staff, picked with the greatest care to insure the promise of a high quality printing service on sheer cottons and rayons.

The advantage of such a service in connection with a finishing plant will be obvious to all converters of fabric. Because of the proximity of New York, Bellman Brook Bleachery, being located only five miles from 42nd St., there will be a saving of time, greater convenience and a further benefit naturally resulting from the finisher's interest in maintaining in the printing the same high standard of quality as in finishing.

The open stock service that Bellman Brook renders can now be used to a full extent as Bellman Brook's facilities thus will cover the full range of finishing, bleaching and dyeing, commercial and vat colors as well as any form of printing.

In the case of Bellman Brook Bleachery, this printing plant opens the opportunity for the further development and exploitation of several chemical finishes for which Bellman Brook has the right, such as permanent finished organdy, opal, diaphane, linen finish and permandy.

Business News

New Timken Company Formed

Announcement has just been made by The Timken Roller Bearing Co. of the incorporation of a new company, known as The Timken Steel and Tube Company, which will take over the manufacture and selling of Timken steel and tubing. The headquarters and mills are in Canton, Ohio, with sales offices in Chicago, Los Angeles, Detroit, and New York. The officers are: H. H. Timken, chairman; M. T. Lothrop, president; J. W. Spray, vice-president; A. J. Sanford, vice-president in charge of sales; J. E. Daily, vice-president in charge of operations; and J. F. Strough, secretary and treasurer.

The company has been organized to take care of the growing demand for Timken Steel among manufacturers of various products, by the production of high grade alloy steels on a quantity basis. Its production facilities consist of modern furnaces and mills with a capacity of 30,000 tons of steel per month. This capacity is equally divided between electric and open hearth steels. The mill is equipped to supply any section or size of hot rolled bar stock, or seamless tubing, in any quantity desired. Specialized high grade alloy steels can be produced conforming to any analysis specified.

H. T. Kelley Now Treasurer of Scott & Williams

Harry T. Kelley, for some years assistant treasurer of Scott & Williams, Inc., 366 Broadway, has been elected treasurer to succeed the late Robert Morse, who had held that office with the knitting machinery company for a long period.

Mr. Kelley is well known in the knitting trade, having been with Scott & Williams for 17 years, serving in the New York office as assistant treasurer, and previously being active in the company's main office when located at Boston, Mass.

Employ Sales Engineer for Philadelphia District

Mears-Kane-Ofeldt-Inc. announce the appointment of Herbert H. Etter as sales engineer for the Philadelphia district comprising Eastern Pennsylvania, Southern New Jersey, Delaware, Baltimore, and Washington.

Mr. Etter is a graduate of Drexel Institute, and has been employed as an industrial sales engineer since his graduation. He was employed for several years by the Public Service Electric & Gas. Co. of Newark, N. J., before entering the employ of the Philadelphia Gas Works Co., from which company he resigned to accept this appointment.

Mr. Etter will make his headquarters at the home office in Philadelphia.

International Combustion Acquires Hedges-Walsh-Weidner Co.

George E. Learnard, president of the International Combustion Engineering Corp., announces that negotiations have been completed for the purchase of the Hedges-Welsh-Weidner Co. of Chattanooga, Tenn., a recent combination of the Casey-Hedges Co. and the Walsh & Weidner Boiler Co., two of the oldest boiler manufacturing companies in the United States.

With this new company, International Combustion acquires a large and general boiler business, and augments its present extensive manufacturing facilities with two modern boiler plants, one of which is an outstanding factor in the sectional header boiler field, and the other has facilities for the manufacture of the largest drums which can be made in the United States.

Combustion Engineering Corp.'s present line of boilers, augmented by that of the Hedges-Walsh-Weidner Co., makes it possible for Combustion to offer any type of boiler, large or small,

Bleachers find their Star

Whether you bleach cotton, wool, rayon, silk or mixtures, the safe assistant to use is "Star" Brand silicate of soda.

This "Star" also has its five shining points which make it the trusty, economical assistant for your peroxide bleach.

1. Its quality standards are uniform and constant.
2. It has reserve alkalinity which neutralizes acids.
3. "Star" is clear and brilliant, which prevents precipitation of impurities.
4. Bleaching baths with "Star" remain clear under conditions where other silicates may fail.
5. You can use "Star" Brand for all fibres or mixtures.

Try "Star" Brand in your mill and be convinced. Send inquiries to —

Silicate Headquarters
Philadelphia Quartz Company
Philadelphia

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NOT the least of the advantages in using this Company's Disodium Phosphate is that of having it arrive clean and uncontaminated—thanks to our use of only A-1 barrels with special paper liners.

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The Rayon Year Book *Is Coming*

Immediately following the Annual Rayon Issue of Textile World (Sept. 29) we will publish the first edition of the Rayon Year Book.

It will be a book with permanent cloth binding and containing in general the following:

1—Statistical information and forecasts on domestic and world rayon production and consumption.
2—Technical articles on use of rayon in all types of textile products and on latest processing methods.
3—Rayon tests, calculations, etc.
4—Directory of world's rayon producers.

This Year Book is the result of an increasing and insistent demand for this class of information in permanent reference form. And the final good news is that the demand is so large we are able to make the price only $1.00 per copy.

Send your orders in advance. Copies will be mailed immediately on publication.

To Advertisers

A small number of advertising pages will be reserved in the Rayon Year Book limited to clients who have space in the Annual Rayon Issue (Sept. 29) of Textile World or those who are regular contract advertisers throughout the year. Details on request.

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~ TEMPERATURE AND HUMIDITY CONTROL ~
Air Conditioned Rooms for Testing Textile Materials, and Establishing Regain
Write for Literature

Carrier Engineering Corporation
NEWARK (Offices and Laboratories) NEW JERSEY

SPINNING, SPEEDER *and* MULE ROLLS
RENECKED, REFLUTED AND HONED
NEW FLUTED ROLLS OF ANY SIZE MADE TO ORDER
George A. Bates Flute Raising Machine for raising worn out Drawing Rolls like this or comber Detaching Rolls.

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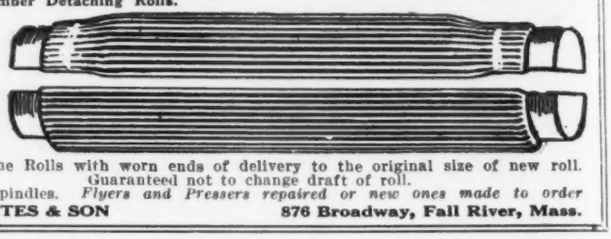

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Speeder Spindles. *Flyers and Pressers repaired or new ones made to order*
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Provide Pure Clean Water for All Industrial Purposes

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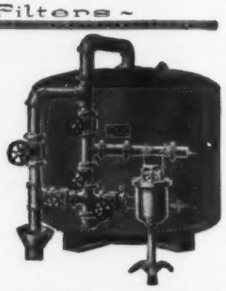
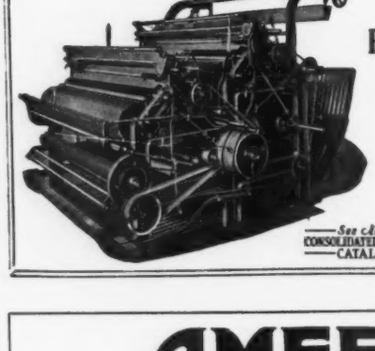


PURE WATER



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INDICATING PRESSURE GAUGES

for pressure, vacuum and draft. Have extra heavy, long wearing, non-corrosive movement. Dial is hand calibrated, insuring accuracy. White enameled matt finish eliminates glare and makes reading easy.
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Dixon's Patent Reversible and Locking in Back Saddle with New Oiling Device, three Saddles in one, also Dixon's Patent Round Head Stirrup.

Send for samples to
DIXON LUBRICATING SADDLE CO., Bristol, R. I.

now available on the American market. This diversity of boiler equipment, supplemented by Combustion's already complete line of fuel burning equipment, enables the company to install steam generating plants of all types and sizes—complete from coal bunker to ash pit—on one contract.

The Hedges-Walsh-Weidner reputation for quality workmanship and precision methods was the basic reason for the negotiations leading to the purchase. From an economic standpoint, the acquisition is as important as from the mechanical, owing to the economies made possible through the consolidation of these properties under one management.

The new acquisition will function in all phases of its activity through Combustion Engineering Corp., the American operating subsidiary of International Combustion Engineering Corporation.

Carpet Wool More Active

(*Continued from page* 93)

has been sold this week at 54½c, being slightly above the market level for this grade, which is held by other dealers at 53c to 54c. Half blood fleece is quoted at 50c for staple. Knitting yarn spinners in this vicinity have been displaying more interest and medium sized sales of quarter blood have been made at the 52c level. Improvement in fleece has not been so pronounced as in territory.

September has been a dull month in pulled and scoured. Prices have not weakened and are remaining steady. There has been a call for small quantities of gray Bs and sales have been reported as high as 80c for this grade. There is little interest in other grades. Stained Bs are quoted at 93c to 95c, average Bs at 95c to $1.00 and best Bs at $1.00 to $1.05.

Next month's wools will be of longer staple and dealers believe a large portion of October pullings will be sold in the grease to worsted spinners as was the case last year, which will make competition stronger than during the last month when wools suitable only for woolen mills have been offered by pullers. Although a number of woolen mills have booked fair sized goods orders it is stated they have not received specifications and until these arrive they are refusing to buy new wools.

Basis Also Weakens

(*Continued from page* 81)

the week of $1.33, whereas the December option is off only $1.10. A fair demand is reported for new crop Uppers, but domestic buyers show little tangible interest in Sak.

Current Quotations

Average prices for Oct.-Nov. shipment of middling and strict middling hard western cotton (Government lengths) are as follows:

	Middling	St. Middling
1 1/16 in.	20½to21c.	21 to21½c.
1 1/16 in. to ⅛ in.	20⅝to21¼c.	21¼to21⅝c.
1 ⅛ in.	21 to21½c.	21½to22c.
1 3/16 in.	22½to23c.	23 to24c.
1 ¼ in.	26 to27c.	27 to28c.

Basis on New York, Oct., 17.68c.

John Malloch & Co., Boston, quote Egyptian cotton, c. i. f. Boston for Oct.-Nov. shipment as follows: Medium Sakelarides, 33¼c, off 2⅜c; Medium Uppers, 22⅝c, off 1⅜c from Sept. 12. They report closing prices Sept. 19 on the Alexandria exchange as follows: Nov. Sak. $32.82, off $2.18, Oct. Uppers $20.19, off $1.33, from Sept. 12.

Botany Sales Manager Sees Trend Toward Femininity in Women's Styles

Femininity is replacing boyish styles for women, according to Oscar C. Seebass, stylist and sales manager of the Botany Consolidated Mills, Inc., who has just returned from a semi-annual trip abroad, during which he attended all the Paris style openings.

"About 80% of the women's styles shown at the openings in Paris were woolens," Mr. Seebass said. "Wool is displacing other fabrics as a style leader this year and printed woolens of light weight are popular.

"Styles in skirts are somewhat longer. Skirts for day wear in Paris fell about two inches below the knee and for evening wear were quite long.

"The trend toward femininity in women's styles is unmistakable. The fashion for mannish or boyish styles has obviously passed."

A. E. Colby Succeeds E. F. Greene on Board of Cotton-Textile Institute

It was announced Sept. 14 that the executive committee of The Cotton-Textile Institute, Inc. had accepted the resignation of Edwin Farnham Greene from the Board of Directors and the executive committee. Mr. Greene recently resigned as treasurer of the Pacific Mills and his resignation from the board and executive committee of the Institute arose from the fact that only officers of member mills of the Institute can be directors or members of its executive committee.

It was also announced that Alfred E. Colby, the new treasurer of the Pacific Mills, had been elected to the board of directors and the executive committee of the Institute to succeed Mr. Greene.

N. H. Publicity Bureau Exhibits Products of Gonic Mfg. Co.

ROCHESTER, N. H.—A wonderful display of the products of the Gonic Mfg. Co. here, made in the windows of the New Hampshire Publicity Bureau at Concord, has attracted widespread attention. The Gonic Mills were established in 1849 and they have operated without serious depression for 79 years. At present they are running at full capacity 23½ hours a day, giving employment to 300 persons with every indication that this number must be materially increased to keep pace with orders. High and medium grade woolen fabrics are the product.

August Dye Imports

Smaller Total Than Monthly Average to Date

WASHINGTON, D. C.—Amounting to 389,957 lbs., invoiced at $317,879, August imports of coal tar dyes were considerably smaller than the average monthly imports to date this year. The month's total represented a decline both from imports in the preceding month and from imports in the corresponding month of last year. Germany furnished 64.5% of the total and Switzerland 25%. Dyes leading in quantity imported during August were: Vat golden yellow GK dbl. paste (single strength), 16,204 lbs.; Vat olive R (single strength), 14,886 lbs.; Brilliant indigo 4B (single strength), 14,132 lbs.; Vat brown G (single strength), 13,068 lbs.; Acid black 2R, 12,886 lbs.

Stocks of dyes and colors remaining in bond amounted 778,670 lbs. and intermediates to 1,873,016 lbs., on May 31, the latest date for which customs figures are available.

Textile Workers Plan to Stage Textile Exposition

An exposition of American-made textiles will be held in New York next spring, according to plans announced Sept. 15 by the executive committee of the United Textile Workers of America at the concluding session of the organization's annual convention at the Great Northern Hotel, New York City. The committee also decided to aid the New Bedford textile workers by raising funds sufficient to carry on the strike.

Arrangements were made with the United Exposition Association to prepare plans for the exposition which will be held in Madison Square Garden or some other suitable place in March. The exposition is planned to display American textile products in an effort to show their superiority over importations. Agents will tour the country during the winter to advocate the purchase of union-made products.

Slater Gets Court Decision Against J. F. Brown

WORCESTER, MASS.—In a decision in the Supreme Court, Worcester, Judge Wilford Gray awarded S. Slater & Sons, Inc., in suit against Jacob F. Brown, a total of $565,151.75 without interest. Interest from Jan. 1, 1920 on this sum will bring the amount well above $800,000, it is stated. Wuskanut Mills, Inc., joint defendant, is held jointly liable for substantially $470,000 of this sum.

In the suit of Wuskanut Mills, Inc., against S. Slater & Sons, Inc., the former is awarded a total of $45,000, which, with interest, will bring it up to about $60,000.

Choate, Hall & Stewart were counsel for S. Slater & Sons, Inc., and Hurlbert, Jones & Hall for Jacob F. Brown.

The Slater litigation arose out of a transaction in 1920, when Jacob F. Brown, who was a trustee of the Slater estate and president of S. Slater & Son, Inc., had expressed intention of withdrawing from management of S. Slater & Co. To retain his services a trade was made under which one of the Slater properties, Wuskanut Mills, was sold to Brown and a five-year contract made between Wuskanut and S. Slater & Son for selling the product in connection with which S. Slater was to make a rebate of $15,000 a quarter for five years. It was the claim of the Slaters that Mr. Brown had committed a breach of contract.

Sanford Plans Preliminary Carpet Showing

Stephen Sanford & Sons, Amsterdam, N. Y., carpet and rug manufacturers, announced to the retail trade of the country on Thursday that an advance opening for the convenience of the retailers will be held during the week of Oct. 1.

The action of the company in determining upon a preliminary showing of new merchandise has been taken, Sanford executives state, in order to meet the needs of the retail trade, which the company serves, for finished goods to offer consumers in the stores during the fall months.

Sanford also announced that the company ratifies the general opening of spring floor covering lines for the week of November 12 and as a matter of policy will cooperate with other manufacturers toward success of the November opening.

New England-Southern Plan Adopted by Stockholders

BOSTON, MASS.—A special meeting of the stockholders of the New England Southern Mills was held Sept. 19 at the office of the company, 24 Federal street, and plans outlined as in the notice to stockholders, dated Aug. 14, for the sale of mills at La Grange and Hogansville, Ga., also Lowell, Mass., and Lisbon, Me., were adopted.

The entire list of suggestions, eight in number, which the stockholders were asked to consider, involving the properties mentioned and other details, were adopted without dissension.

Lockwood, Greene & Co. Becomes Holding Company Oct. 1

BOSTON, MASS.—Effective Oct 1 Lockwood, Greene & Co. will cease to manage New England Southern Mills, Lancaster Mills and Winnsboro Mills, Inc.

Having sold its engineering division Lockwood, Greene & Co. will thus shortly become purely a holding company for mill securities. The next step has not yet been decided upon.

Piedmont (S. C.) Mfg. Co., is making progress with the installation of the new 720 h.p. Hedges-Walsh-Weidner boiler which will be fired with pulverized coal. This additional unit in the steam plant of this mill will probably be operated about November. J. E. Sirrine & Co., Greenville, S. C., are the engineers.

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Silk, Cotton, Worsted, Artificial Silk, Linen and Novelty Yarns, Twisting, Doubling, Reeling, Cops, Cones, Tubes, and Skeins, Winding in every form, single and multiple.

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Morrisville, Bucks Co., Pa.

The TEXTILE CLEARING HOUSE

Situations Wanted

Manufacturers who are in need of superintendents or overseers for any department of mill work may learn of suitable men upon application by mail or telephone to C. T. DONLEVY, care Textile World, 65 Franklin Street, Boston, Mass.

ASST. SUPT. & DESIGNER IN WLN. OR WST. MILL OR DESIGNER IN SMALL MILL. Position wanted by man 22 yrs. of age, American, single. Worked on all kinds woolen and worsteds. First class recommendations.
O. B. 216, Textile World, Boston, Mass.

SUPT. AND DESIGNER IN WLN. OR WST. MILL. Position wanted by man 45 yrs. of age, Scotch, married. Worked on some worsteds and principally on fine woolen suitings and overcoatings. Good references.
O. B. 236, Textile World, Boston, Mass.

OVERSEER DYEING. Position wanted by man 27 yrs. of age, Swiss, single. Worked on cotton, silk, wool, art. silk, pieces or skeins, also vat colors. Familiar with German, English and Swiss dyeing machines. Good recommendations.
O. B. 253, Textile World, Boston, Mass.

PLUSH MILL SUPERINTENDENT. Position wanted by man 31 yrs. of age, English (Am. cit.), married. Worked on cotton, ramie, art. silk, worsted, mohair and silk plush. Familiar with practically all standard makes of plush machinery. A No. 1 recommendations.
O. B. 288, Textile World, Boston, Mass.

SUPT. OR ASST. SUPT. IN WORSTED WEAVING MILL OR SALESMAN ON WORSTED YARNS. Position wanted by man 36 yrs. of age, American, married. Worked on worsted goods, men's and women's wear. Familiar with all textile machinery used in weaving mill. Good recommendations.
O. B. 458, Textile World, Boston, Mass.

SUPT., ASST. SUPT. OR DESIGNER IN WOOLEN MILL. Position wanted by man 50 yrs. of age, English-Canadian, married. Worked on cassimeres, overcoatings, dress goods, cloakings, worsteds and woolens. Familiar with all makes machinery. Good references.
O. B. 563, Textile World, Boston, Mass.

OVERSEER WOOLEN SPINNING DEPT. Position wanted by man 31 yrs. of age, American, single. Worked on woolen, shoddy, part silk and rayon. Familiar with Johnson & Bassett mules. Good recommendations.
O. B. 824, Textile World, Boston, Mass.

EFFICIENCY WORK, OVERSEER WEAVING, SECOND HAND OR LOOM FIXER. Position wanted by a man 31 yrs. of age, English, married. Has worked on blankets, wool and worsteds, and cottons. Familiar with C&K automatic jacquard or Knowles head looms. Good recommendations.
O. B. 536, Textile World, Boston, Mass.

HOSIERY MACHINE FIXER. Position wanted by man 38 yrs. of age, American, married. Worked on infants, ladies', half hose, cotton, silk, worsted and rayon. Familiar with Banner and Scott & Williams machines. Good references.
O. B. 774, Textile World, Boston, Mass.

SUPERINTENDENT OR FOREMAN BLEACHER. Position wanted by man 45 yrs. of age, American, married. Worked on all kinds of cotton piece goods, also rayon silk, silk and wool. Familiar with Rodney Hunt and in fact all kinds of machines used in cotton bleaching and finishing. First class references.
O. B. 795, Textile World, Boston, Mass.

ASST. SUPT. OR OVERSEER SPINNING & TWISTING IN WORSTED MILL. Position wanted by man 50 yrs. of age, English, married. Worked on worsted, hair and spun silk. Familiar with Prince Smith, Saco-Lowell, Hall & Stells machines. Good references.
O. B. 840, Textile World, Boston, Mass.

POSITION IN DESIGNING DEPARTMENT. Position wanted by young man 21 yrs. of age, American, single. Worked on cotton, woolen and worsted. Good references.
O. B. 888, Textile World, Boston, Mass.

OVERSEER WEAVING IN WOOLEN MILL. Position wanted by man 32 yrs. of age, American, married. Worked on men's suitings, automobile upholstering, light overco tings, cap and knicker goods, novelty cloth, and plaid back overcoatings. Familiar with C&K, Crompton and Thayer and Knowles looms. First class references.
O. B. 1206, Textile World, Boston, Mass.

OVERSEER DYEING OR DEMONSTRATOR ON COTTONS. Position wanted by man 39 yrs. of age, American, married. Worked on cotton yarns, skeins, piushes, raw stock, piece dyes, slubbing. Familiar with warp dyeing machines, raw stock machine and open kettles. Good references.
O. B. 152, Textile World, Boston, Mass.

SUPT. WORSTED YARN MILL. Position wanted by man 44 yrs. of age, American, married. Worked on all kinds of wool, coarse and fine, mohair, rayon and silk of all kinds of mixtures for carpet, dress goods and knitting yarns. Familiar with all makes of English and American machinery. Good recommendations.
O. B. 349, Textile World, Boston, Mass.

BOSS STARCHER IN COTTON MILL. Position wanted by man 29 yrs. of age, American, single. Worked on all classes of goods. Familiar with mangles and cans, tenter frames, Butterworth and Textile Fin. Mchy. Co. machines. A No. 1 references.
O. B. 358, Textile World, Boston, Mass.

OVERSEER FINISHING IN SMALL MILL OR SECOND HAND. Position wanted by man 22 yrs. of age, American, single. Worked on suitings, overcoating, stock, mostly reworked wool. Familiar with all makes finishing machinery. Fine recommendations.
O. B. 607, Textile World, Boston, Mass.

OVERSEER DYEING OR CHEMIST. Position wanted by man 43 yrs. of age, American, married. Worked on all kinds woolen, worsted, cotton and merc. cotton, jute and hemp yarns. Familiar with Klauder-Weldon and Hussong machines. Good recommendations.
O. B. 625, Textile World, Boston, Mass.

AGENT OR SUPERINTENDENT OF WOOLEN MILL. Position wanted by man 50 yrs. of age, American, married. Worked on face finish goods and has had experience on all grades from cotton warps to 5 R all wool suitings. A No. 1 recommendations.
O. B. 626, Textile World, Boston, Mass.

OVERSEER DYEING. Position wanted by man 50 yrs. of age, English, married. Worked on yarn, cloth, and raw stock. Familiar with Klauder-Weldon, Walker & Davis and Hussong machines. First class references.
O. B. 772, Textile World, Boston, Mass.

OVERSEER WEAVING IN WLN. OR WST. MILL. Position wanted by man 50 yrs. of age, American, married. Worked on woolens and worsteds. Familiar with C&K looms. Good references.
O. B. 1233, Textile World, Boston, Mass.

ASSISTANT DESIGNER IN WOOLEN MILL. Position wanted by man 28 yrs. of age, American, married. Worked on twist fabrics (woolen), plaid backs, bolivias, kerseys, meltons, cassimeres, in fact all kinds woolen goods. Familiar with D&F cards and mules, and C&K looms. Good recommendations.
O. B. 1321, Textile World, Boston, Mass.

OVERSEER COTTON SPINNING. Position wanted by man 42 yrs. of age, American, married. Worked on all kinds of cotton yarns. Familiar with all makes spinning frames. First class recommendations.
O. B. 1377, Textile World, Boston, Mass.

WORKS CHEMIST OR SALESMAN FOR DYESTUFFS. Position wanted by man 31 yrs. of age, single. Worked on tungsten and glass. Good recommendations.
O. B. 997, Textile World, Boston, Mass.

SUPT.—ASST SUPT. OR OVERSEER WEAVING. Position wanted by man 43 yrs. of age, Am., married. Worked on all kinds of woolens and worsteds. Familiar with all makes looms. First class references.
O. B. 1235, Textile World, Boston, Mass.

Predetermined Production

(*Continued from page 30*)

grounds that, until recent years no practical or scientific plan had been developed whereby the former could be readily disclosed and presented as a distinct item of cost. Such an excuse is no longer plausible since by the use of a combination of sound textile and accounting calculations it is possible to compute with facility, the cost of both non-production and subnormal production, as distinguished from the cost of actual production during any current period. Such a cost when obtained can be readily applied to the normal cost of each and every fabric in order to arrive at its full actual cost for the purpose of establishing intelligent sales policies.

Kill Three Birds with One Stone

Under such a treatment of developing costs it is possible to kill three birds with one stone. It is possible to determine at the same time, the following:

1. The normal cost of each fabric obtainable under normal possibilities.

2. The amount, the location and the cause of differences between normal possibilities and actual accomplishments.

3. The total actual full cost by merely applying departures from normal to the normal cost of each fabric, the latter application being made weekly or monthly, or whenever it is desirable to know the full cost for the purpose of establishing selling prices.

Comparisons made merely at stated periods between predetermined actual costs and ascertained actual costs, such as is suggested in the cost outline of The Cotton-Textile Institute, cannot possibly indicate whether or not there was a possible saving to the mill in a reduction of the cost as estimated. Such comparisons merely indicate to what extent the original estimate of probable cost was accurate.

There seems to have been a recent tendency toward cost comparison between mills. Such comparisons have been more the source of argument and dissatisfaction than of decision and benefit. This can probably be explained by the fact that costs presented for comparison have been prepared upon a basis of full or ascertained costs rather than upon the basis of normal costs. Costs prepared upon the basis of actual production and actual expenditures fluctuate widely and are therefore not subject to intelligent comparison.

Any attempt of mills to gauge their own efficiency by comparing fabric costs built up from their own actual production experience with like fabric costs in other mills built up from entirely different experiences, will, in our opinion, lead to nothing of importance or value either with respect to individual mills or with respect to the industry as a whole.

There is, however, a decided similarity between the normal costs of like fabrics woven in different mills. The cause for this similarity can be explained logically, as follows:

1. The normal production of each loom on like fabrics, together with the normal production of the machinery required to furnish yarn for this loom during a fixed number of hours, is substantially the same, due to the fact that machinery speeds throughout the industry producing like fabrics and yarns, are practically identical. In dealing, therefore, with normal machinery production in fixed hours, we are dealing with something that is decidedly stationary and tangible.

2. Labor rates paid by different mills are substantially uniform, so also are prices paid for mill supplies. Total labor and supply expenditures may differ widely as between mills, but when they are normally applied to a loom making a fabric, and to the machinery required to furnish yarn for that loom, the resulting normal unit cost of like fabrics will be found to approximate each other. No exception to this conclusion need be made with regard to the item of overhead for even when this item is computed upon the foregoing basis, it will compare favorably as a distinct unit of fabric cost.

Normal individual fabric costs can be prepared accurately, scientifically and rapidly by the use of textile calculations. Furthermore, they can be adjusted with facility to take care of those slight but important changes occurring occasionally in normal operating conditions, such as changes in machinery speeds, piece and hour rates, etc.; changes directly and pertinently related to them.

With a knowledge of normal individual fabric costs it is then but a step —a short step—to a knowledge of full actual costs, that is to say, those costs which are made to absorb every dollars worth of expense, plant idle or not idle.

Under proper accounting treatment the step from normal costs up to actual or full costs can be made automatically. In fact, variations from normal—i. e., differences between normal and actual accomplishments expressed as a cost in dollars and cents of non-production and subnormal production, can always be known. They can then be readily applied, when desirable or expedient, as an addition to normal fabric costs, while at the same time neither the identity nor the cause of this additional cost is destroyed.

William Iselin & Co. to Sell for Slater Mills, Inc.

William Iselin & Co. announce that they have been appointed selling agents for Slater Mills, Inc., of Webster, Mass., which is a subsidiary of S. Slater & Sons, Inc. The handling of this product by William Iselin & Co. is to be in close cooperation with the southern branch of S. Slater & Sons, Inc.

Textile World

Rayon Issue

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Domestic Rayon Output Increases 30% in 1928 and Promises Equal Growth Next Year

Enlarged Production Absorbed despite Depressed Conditions Prevailing in the Consuming Trades

By Douglas G. Woolf

AN increase of over 30% in the domestic output of rayon during 1928, as compared with 1927, is forecast by TEXTILE WORLD'S estimate of production. At the same time a further increase of 30% is indicated for 1929, as against 1928.

This bald statement of statistical fact loses its drabness when it is considered in conjunction with the conditions which have confronted the textile industry in general during the year. Faced with a situation of depression and adjustment in most of its consuming trades, the rayon industry might have been expected to reflect this sub-normality and to encounter another one of those "dips" such as it met in 1926 when for a time production over-reached consumption. Instead, the consumption of rayon this year should be about 20% greater than last year, if the forecasts shown in the accompanying tables are correct.

It is true that rayon manufacturers did not find, in the first six months of this year, quite such easy going as during most of 1927; and that at times the resale trade encountered difficulty in disposing of their stocks at list prices. More aggressive salesmanship has been required to maintain the statistical position. Nevertheless, it is apparent from the best reports that can be secured from all sections of the trade that the bulk of the domestic output has been absorbed; that an importation, less than that of 1927 but still of sizeable quantity, has also been taken up; and that the market at present is being featured by continued improvement, with no indication of over-abundance of stocks or early necessity of price declines. Furthermore, there is no indication that the enlarged output which will result from the many new units now in construction, will not find a ready outlook—making allowance of course for temporary gaps which, as repeatedly stated in these columns, must always be expected in the development of a new industry.

Domestic Production by Companies

In Table I is shown TEXTILE WORLD'S estimate of domestic rayon production, by companies, for the first seven months of 1928; for the entire year 1928; for the year 1929; with 1927 output being given for comparison. It will be noted that the probable output this year will be 98,650,000 lbs. This represents about 11 times as great a production as in the year 1920 and is twice the entire world production of that year. The probable production for 1929 is given at 129,200,000 lbs. Naturally, the latter figure is subject to revision since in many cases it is difficult to determine just how much of the production of new units will reach the market during next year. Every attempt has been made to keep the estimates on the conservative side.

The 1928 estimate is approximately 3,000,000 lbs. greater than the forecast for this year published in the Annual Review and Forecast Number in February—indicating that the domestic firms kept ahead of their programs rather than lagging behind them, as the general textile conditions might have seemed to warrant. The fact that their increased output was absorbed is in itself evidence of the stable position which rayon has earned for itself as a raw material in the textile industry.

Domestic Consumption of Rayon

On the basis that the apparent consumption of rayon is represented by production plus imports, Table II compares this factor for the years from 1921 to 1928, inclusive. The latter is of course an estimate since it was necessary to approximate imports for the remainder of the year on the basis of those in the first seven months, for which figures are available at this writing. It will be noted that the consumption in 1928 will be over five times that of 1921.

Importation of Rayon

Imports of rayon have shown a declining tendency since the first of the year. Table III gives figures for the first seven months of 1928 and for the entire 12 months of the years 1924 to 1927, inclusive. The

TABLE I—TEXTILE WORLD'S ESTIMATE OF DOMESTIC RAYON PRODUCTION

	Total 1927 Lbs.	1st 7 Mos. 1928 Lbs.	Total 1928 Lbs.	Total 1929 Lbs.
The Viscose Co	41,000,000	30,500,000	53,000,000	65,000,000
Du Pont Rayon Co	15,100,000	10,500,000	19,000,000	24,000,000
Tubize Artificial Silk Co. of America	7,500,000	5,250,000	9,000,000	11,000,000
Industrial Rayon Corp	3,450,000	2,625,000	4,500,000	6,500,000
Celanese Corp. of America	3,500,000	3,000,000	5,000,000	6,000,000
American Bemberg Corp	.....*	1,490,000	2,700,000	5,000,000
American Glanzstoff Corp.	.....†	.....	250,000	4,500,000
Belamose Corp	1,400,000	800,000	1,400,000	1,700,000
Acme Rayon Corp	500,000	425,000	800,000	1,000,000
Delaware Rayon Co	500,000	700,000	1,500,000	2,000,000
Other Firms	2,100,000	1,000,000	1,500,000	2,500,000
Total	75,050,000	56,200,000	98,650,000	129,200,000

* Included last year under heading "Other Firms."

† Not in production last year.

highest monthly importation on record was that of May, 1927, when 1,785,538 lbs. were brought in. During the last ten months of that year, a high rate was maintained. A sharp drop was noted in April of this year and continued through July, the last month for which figures are available at this moment. As against January's imports of 1,366,018 lbs. may be compared July's figure of 658,949 lbs., or a drop of over 50%. An attempt has been made to approximate the imports for the entire year, using the average monthly figure during the first seven months as the basis. If this assumption proves to be correct, the imports this year will amount to 11,698,788 lbs. as against 16,222,545 lbs. in 1927. However, if the monthly rate of importation continues to decline during the last five months as it did during the first seven, the total for the year will fall considerably short of this estimate.

In conjunction with this table may be considered Table IV which shows imports into United States by countries for the years 1924 to 1928, inclusive. The figures for the latter year have been estimated on the assumption that imports for the last five months will be on the same monthly average basis as during the first seven months. Here, too, it is quite possible that the actual importations for all of 1928 may be lower than this assumption would indicate. Using this basis, however, it is interesting to note that Italy is still the largest source of supply of rayon and that Germany and France follow in second and third position. However, the relative percentage of the two latter countries, as against Italy, would be higher than was true in 1927.

World Rayon Production

It is still difficult to present estimates of world rayon production which bear the same presumption of accuracy as do those for this country since production figures are not given out as readily in many countries abroad as here. However, the Manchester (England) rayon correspondent of TEXTILE WORLD has made a careful study of this situation and has maintained a table of estimates which he revises from time to time as actual conditions seem to warrant. In Table V, is given his estimate of world production by countries for the years 1926, 1927 and 1928. The latter year of course is subject to considerable revision as more definite facts become known at the end of the year. His forecast indicates more than a 30% increase in 1928 over 1927. Incidentally, this checks with our own estimate of domestic increase this year as against last, which indicates that the same rate of progress is being made throughout the world at large.

According to his table, Great Britain still holds second place although trailing the United States by nearly 50%. Italy is a close third and is followed equally closely by Germany. The rate of increase in Great Britain is shown to be particularly large and is one of the outstanding features of the table. Both Germany and France are also advancing at a rapid rate.

These figures enable the presentation of Table VI which shows the growth in both United States and world rayon production by years from 1920 to 1928, inclusive. If the estimates for the latter year are approximately correct, the domestic output has increased nearly eleven times during that period, while the world output has increased about seven times.

Outlook for the Future

The writer offers no apologies for the fact that he is, and has been, a consistent "bull" on rayon. Thus far developments have justified the position he has maintained for many years and there is nothing in the outlook for the future which would induce him to change his attitude. If rayon can maintain its rapid growth in the face of the general textile conditions during the first half of this year, it certainly should be expected to do at least as much during the period of improvement which is undoubtedly under way.

It is still impossible to place any limits on the potential increase in the use of synthetic fibers. Limits which a few years ago seemed radical now appear ultra-conservative. That further expansion is inevitable, cannot be questioned. The rate and possible end-point of this expansion are beyond the imagination of the writer.

During the future growth, we may expect technical developments which will be far more amazing than any mere statistical advance. The progress which has been made in improving the quality of the various synthetic fibers will appear insignificant when compared with the changes in methods and products which must be anticipated for the future.

There is still no assurance that the viscose process, for example, will always be the dominant factor in rayon production. As a matter of fact, it has already felt encroachment from the other processes. However, it is equally impossible to state that any one of the latter is destined to usurp the position held so long by viscose. Developments in fundamental research in cellulose chemistry and in the application of that research may produce a process and a product unthought of today, and yet which may in time dominate the industry. This is said, not from the standpoint of unthinking theory, but from a knowledge of what chemical and physical research can accomplish in any field—and particularly in one so inviting as is synthetic fiber manufacture.

Opinions of Executives

As a supplement to his own expression of opinion, the writer presents below statements secured from several executives in domestic rayon producing firms:

S. A. Salvage, president, The Viscose Co.: "I expect the consumption of rayon will increase steadily during the next few years. The Viscose Co. does not expect to be able to produce a sufficient quantity to supply the demand put upon it for the year 1928. There is no thought of making a change in prices this year, and there is nothing in the present situation which would indicate a change in any particular time in the future."

* * *

B. M. May, vice-president, Du Pont Rayon Co.: "That our outlook

TABLE II—DOMESTIC CONSUMPTION OF RAYON
(Represents Production plus Imports)

Year	Lbs.
1921	21,667,186
1922	28,087,775
1923	38,906,037
1924	40,461,987
1925	59,200,521
1926	72,701,277
1927	91,272,545
1928	110,348,788*

* Estimated.

TABLE III—RAYON YARN IMPORTS, BY MONTHS

	1924 Lbs.	*1925* Lbs.	*1926* Lbs.	*1927* Lbs.	*1928* Lbs.
January	251,951	205,627	597,103	680,610	1,366,018
February	132,717	619,408	643,448	861,339	1,145,746
March	87,430	522,139	1,257,034	1,757,208	1,079,582
April	89,444	431,686	739,247	1,518,320	843,803
May	96,555	332,737	769,477	1,785,538	909,386
June	144,664	308,592	857,912	1,312,912	820,809
July	78,050	546,695	739,128	1,231,124	658,949
August	119,196	590,357	661,759	1,510,748	.....
September	181,614	622,304	878,604	1,129,476	.....
October	170,120	825,223	995,315	1,385,745	.....
November	170,238	1,118,679	964,164	1,285,157	.....
December	190,008	877,064	1,023,096	1,764,368	.....
Total	1,711,987	7,000,521	10,126,277	16,222,545	11,698,788*

* Total for 1928 estimated on assumption that imports for last five months of year will be on same monthly average basis as during first seven months.

TABLE IV—RAYON YARN IMPORTS INTO U. S. BY COUNTRIES

	1924 Lbs.	*1925* Lbs.	*1926* Lbs.	*1927* Lbs.	*1928** Lbs.
Austria	16,826	149,259	352,494	425,467	203,472
Belgium	274,960	589,840	739,509	585,815	814,044
Czechoslovakia	18,417	21,256	9,734	1,238	96
France	13,376	298,344	713,412	2,863,509	2,167,812
Germany	231,288	1,515,016	2,554,192	2,603,123	2,505,528
Italy	107,573	2,261,965	2,489,284	6,747,229	4,382,544
Netherlands	577,551	1,003,682	2,587,337	2,627,529	1,340,628
Switzerland	126,343	470,934	509,806	243,479	219,768
United Kingdom	345,292	600,583	107,030	53,773	35,664
Canada	358	16,707	.....	49,460	2,244
Hong Kong	3	.....	.....	.....	.....
Gibraltar	.....	13,813	.....	.....	.....
Poland & Danzig	.....	54,732	13,093	.....	.....
Spain	.....	10	50,100	.....	.....
Japan	.....	4,380	.....	687	144
Hungary	.....	.....	25	20,123	25,704
Greece	.....	.....	.....	70	.....
Argentina	.....	.....	.....	880	1,132

* Totals for 1928 estimated on assumption that imports for last five months of year will be on same monthly average basis as during first seven months.

for the rayon business generally is favorable is indicated by our continued expansion. Our business for 1928 shows a very gratifying increase over the business for 1927 and there appears to be no indication of price adjustments nor other unfavorable signs that the rayon business has not yet great forward strides to make."

* * *

A. M. Tenney, sales director, American Bemberg Corp.: "New uses for all yarns spun from various modified cellulose solutions are being found and worked out daily, and undoubtedly, in our opinion, the consumption of these yarns will greatly increase. The prices for the balance of the year will in the main, in our opinion, remain unchanged. We believe the tendency on the part of weavers and knit goods manufacturers using these yarns is towards finer deniers and multi-filaments, resulting in stress being put upon quality rather than price."

* * *

A. L. Erlanger, sales manager, American Glanzstoff Corp.: "Our faith in the future of rayon is unbounded and we believe that the present United States production, including all pending constructions of new mills and additions to old ones, will be taken up promptly by the American textile industries. Naturally the importation may suffer first—especially importation of ordinary or inferior rayons. In addition to our domestic production we expect to import and distribute through the coming year at least as much fine filament and fine denier yarn as we have in the past. For the time being we will produce in our Elizabethton plant only 150 denier yarn and it will be some time before the operators are sufficiently trained to take up the production of finer filament and finer denier yarns."

* * *

Vice-president of an important rayon-producing firm.: "We believe that the general use of rayon is expanding and that its value in the textile field is proving itself more important continuously. Although business in rayon has not been as brisk in this quarter as formerly, considering the increased production and the general condition of the textile trade, rayon is doing exceedingly well."

* * *

C. C. Bassett, Jr., assistant general sales manager, The Viscose Co.: "The summer ended with the Viscose Co. having completed a period of very satisfactory sales, particularly in view of the seasonable summer slackening of business in the textile field. The fall and winter seasons are being approached most optimistically, and it is expected that a very large volume of rayon yarn will be consumed, in a far broader field than heretofore.

"The appreciation, by the ultimate consumer, of the value and beauty of rayon fabrics is steadily increasing, and the manufacturers are bending every effort to improve, even beyond the high standard of today, the quality of the product as far as chemical and mechanical genius can function.

"Some of the outstanding fabrics which are catching the public appeal particularly, are rayon transparent velvets, rayon crepes, rayon moires, rayon taffetas and rayon satins, in addition to the more standard rayon merchandise such as underwear fabrics to which added beauty of style and design has been given.

"The development of dull luster rayon, such as 'Dulesco,' has had an enormous effect particularly upon the underwear and hosiery divisions of the textile industry, and it is fast being used in woven fabrics, where a soft luster is definitely desirable.

"With the increasing popularity of rayon merchandise and the greater diversification in the production of rayon yarns to meet all purposes for which it is and can be used, the future of the industry is very bright. Increased production of quality yarns will be readily absorbed, and it is very unlikely that the production of quality yarn will exceed the demand over a period for some time to come, particularly in view of the broader merchandising policies being followed by the trade today.

"Tremendous effort is being expended to give all factors interested in rayon materials, the absolute truth regarding the beauty and utility of rayon in various types of merchandise, and it is most optimistically expected that, where this country is using today approximately 120,000,000 lbs. per year, this figure will be greatly increased not far in the future."

* * *

Hiram S. Rivitz, president, Industrial Rayon Corp.: Due to illness resulting from an automobile accident, Mr. Rivitz was unable to prepare a statement for this special Rayon Issue, but we quote below from his semi-annual report: "The first six months of 1928 were fraught with uncertainties in the textile lines. Rayon consumers—cotton, hosiery, underwear, silk manufacturers, and practically all others consuming rayon—were slow to place orders at the beginning of the year due to a marked decrease in the demand in their own lines.

"The second half of 1928, however, is showing a gradual improvement in every branch of the textile industry, and we can say with some degree of assurance, based on our present bookings, that we will have little difficulty in disposing of our present production on a profitable basis for the balance of this year—which would indicate that our profit for the second half of 1928 will be at least equal to that of the first half of the year.

"The total production of rayon in the United States for 1928 is estimated at 90,000,000 to 95,000,000 lbs. Shipments from foreign countries, based on Government reports to date, would indicate a total import for 1928 of approximately 12,000,000 to 13,000,000 lbs.—a rayon consumption in this country for 1928 of 102,000,000 to 108,000,000 lbs.

"The probable increase in rayon production in this country in the next three years, due to erection of new rayon plants actually under construction or in the formative stages of financing, including the known expansion programs of those already established and operating here, will probably not exceed a maximum of 35,000,000 to 40,000,000 lbs.—assuming that all the rumored promotion propaganda we hear about will be realized.

"It takes time to build, man, organize and operate a rayon plant successfully; it takes more time to produce quality rayon, and still more time to build up tonnage on a profitable basis.

"Investors in rayon securities are now asking if the industry will not shortly face an over-production due to the proposed expansion, and the management believes that this short summary will, in a measure, clarify a situation which may otherwise confuse those who are not directly concerned with the manufacture and distribution of rayon.

"A forecast of market conditions three years hence is, of course, pure conjecture, but if the last three years' increase in the production of

TABLE V—WORLD PRODUCTION BY COUNTRIES

Country	*1926*	*1927*	*1928†*
United States	62,575,000	75,050,000	98,650,000
Great Britain	25,500,000	38,803,000	52,000,000
Italy	35,000,000	36,000,000	45,000,000
Germany	26,000,000	31,000,000	41,000,000
France	17,500,000	21,000,000	30,000,000
Holland	13,500,000	16,500,000	16,500,000
Belgium	13,100,000	13,500,000	15,000,000
Switzerland	8,000,000	10,340,000	12,000,000
Japan	5,500,000	8,000,000	12,000,000
Poland	2,000,000	4,000,000	7,500,000
Austria	3,500,000	3,500,000	4,500,000
Czechoslovakia	2,800,000	3,500,000	3,500,000
Spain	300,000	1,000,000	2,500,000
Hungary	.....*	.....*	1,000,000
Canada	2,250,000	2,600,000	3,750,000
Brazil	.....*	.....*	1,000,000
All others	1,555,000	2,075,000	1,500,000
	219,080,000	266,868,000	347,400,000

* Included in "all others." † Estimated.

TABLE VI—U. S. AND WORLD RAYON PRODUCTION

Year	*United States Lbs.*	*World Lbs.*
1920	9,000,000	50,000,000
1921	18,000,000	65,000,000
1922	26,000,000	79,738,000
1923	35,000,000	97,000,000
1924	38,750,000	141,164,000
1925	52,200,000	185,000,000
1926	62,575,000	219,080,000
1927	75,050,000	266,868,000
1928	98,650,000*	347,400,000*

* Estimated.

rayon in this country is an indication of what we may expect in the next three years, we feel perfectly safe in stating that the contemplated increase is not at all out of line with the natural growth of the rayon industry.

"Able executives in close contact with the industry, with many years experience, have frequently expressed the opinion that the consumption of rayon in this country for the next five years will be three to five times our present production. Your management feels that the manufacture of rayon is still in its infancy, that greater strides will be made in its development and fabrication in the next five years than have been made in the last ten years, and this in itself will promote new uses and open up new channels for rayon in an ever-widening market.

* * *

Progress by Companies

The increased output indicated for this year and the still further expansion forecast for 1929 are made possible by the building of new units by existing companies; and by the establishment of new companies who are constructing plants here. Several of the latter represent organizations which have been formed by foreign concerns.

One of the outstanding features of the year has been the decision of three American companies to enter the cellulose acetate field, formerly dominated by one concern. Two of these entries are old established firms whose product has previously been exclusively viscose. The other is a newly organized company, established by foreign interests. The situation in this branch of the industry will be an exceedingly interesting one to watch. The acetate product has been regarded as a specialized material whose uses have stricter limitations than do the products of other processes. Nevertheless, there has been an increased interest shown in acetate by foreign producers and it certainly can be stated positively that the American firms which have announced their entrance into this branch would not have taken the step without careful consideration of the market possibilities of the product.

The South still seems to be the center of attraction as a location for new plants since that section has secured practically all the new units.

The following is a brief summary of the significant developments which have characterized the progress of individual companies in the domestic rayon industry recently:

* * *

Acme Rayon Corp, Cleveland, O. (viscose process): Continues to expand, producing probably 800,000 lbs. this year against 500,000 lbs. last year. Output for 1929 estimated at 1,000,000 lbs.

* * *

American Bemberg Corp., Elizabethton, Tenn. (cuprammonium process): Second unit has been in course of construction during year and should be in production shortly with small daily poundage which will be gradually increased to end of year. This unit will have capacity of approximately 2,400,000 lbs. per year. From its two units, the company should secure output of approximately 5,000,000 lbs. in 1929.

* * *

American Chatillon Corp., Rome, Ga. (viscose and acetate processes): Company organized early in year as subsidiary of La Soie de Chatillon, of Italy, with capital of $10,000,000. Rapid progress being made on construction of plant at Rome which, when in full production, will have daily output of 6,000 lbs. of acetate and 12,000 lbs. of viscose rayon.

* * *

American Enka Corp. (viscose process): Company organized this spring as American branch of the Dutch Enka Co. Site has been selected on large tract, 2½ miles west of Asheville, N. C., and main building will be 330 feet wide with two arms, 1,600 feet and 1,100 feet long. Cost is estimated at $10,000,000. Company is capitalized at $16,000,000. Expected that plant will be ready at close of 1929. Production 30,000 lbs. daily. New York office is at 114 East 32nd Street.

* * *

American Glanzstoff Corp., Elizabethton, Tenn. (viscose process): Production in new plant started Aug. 1 on small scale. Output for 1929 should be 4,500,000 lbs. When first unit is running full capacity, company expects to go ahead with second unit which should bring total capacity to at least 7,500,000 lbs. annually. Also expects to have converting plant for copping, coning and spooling.

* * *

Belamose Corp., Rocky Hill, Conn. (viscose process): Continues to make steady progress in production and anticipates output of 1,700,000 lbs. in 1929.

* * *

Burlington Rayon Corp., Burlington, N. C.: Company has site of over 600 acres, and buildings already constructed cover over 90,000 sq. ft. Understood that there have been installed thus far 12 spinning machines of 160 spindles each, built by Max Ams Chemical Engineering Corp., Bridgeport, Conn. Financial interests back of company are headed by Albert M. Johnson, president of National Life Insurance Co., Chicago. Information not available regarding nature of process or date of probable start of commercial production.

* * *

Celanese Corp. of America, Amcelle, Md. (acetate process): Has continued to expand output and new unit should increase production to 6,000,000 lbs. per year.

* * *

Delaware Rayon Co., New Castle, Del. (viscose process): Developed 50% expansion this year and expects to produce 2,000,000 lbs. in 1929.

* * *

Du Pont Rayon Co. (viscose and acetate processes): Continuing to increase manufacturing facilities at Old Hickory, Tenn. This plant and the Buffalo, N. Y., plant operate under viscose process, as will the new plant at Richmond, Va., which should be in operation within 12 months. In addition, the company has acquired site at Waynesboro, Pa., where it will erect plant for manufacture by acetate process. Has acquired sales and manufacturing rights to operate under this process by Rhodiaseta patents controlled in France. Total output of company in 1929 should approximate 24,000,000 lbs.

* * *

Furness Corp., Gloucester City, N. J. (cuprammonium process): In semi-commercial production under process developed by William H. Furness.

* * *

Industrial Rayon Corp., Cleveland, O. (viscose process): Has increased production basis of Cleveland plant to 4,500,000 lbs. annually and expects to increase this to 5,000,000 lbs. within six months. Erecting new plant at Covington, Va., which when completed will produce 5,200,000 lbs. annually; this plant should be in operation before end of 1929.

* * *

Napon Rayon Corp., Clifton, N. J. (cuprammonium process): Now producing new type of rayon and equipment being changed as rapidly as possible to bring plant up to its full capacity under the new process.

* * *

New Bedford Rayon Co., New Bedford, Mass. (viscose process): Organized in June and understood to be affiliated with Delaware Rayon Co. Purchased mills No. 1 and 2 of Manomet Mills and expects to get into operation within eight months.

* * *

Rosland Corp., Paterson, N. J. (cuprammonium process): Started with initial production of 500 lbs. per day which is being increased steadily.

* * *

Skenandoa Rayon Corp., Utica, N. Y. (viscose process): Continuing to increase its output.

* * *

Tubize Artificial Silk Co. of America, Hopewell, Va., (nitro-cellulose process): Maintaining increase in output with prospects for further expansion in 1929. Estimated production this year was 9,000,000 lbs., with probability of 11,000,000 lbs. being produced in 1929.

* * *

Viscose Co. (viscose and acetate processes): Continued expansion of its viscose rayon production at its plants at Marcus Hook, Pa., Roanoke, Va., Lewistown, Pa., and Parkersburg, W. Va., the latter being the newest. Is also constructing plant at Meadville, Pa., for manufacture of cellulose acetate yarn; initial capacity will be 100,000 lbs. per week, based on 75 denier. Expects to produce 65,000,000 lbs. in all its plants in 1929.

* * *

Woonsocket Rayon Corp., Woonsocket, R. I.: Understood to have been organized by interests affiliated with Manville Jenckes Co. to manufacture rayon in the old Nourse mill belonging to the latter company. Understood that plant should be in operation by first of year.

Many Important Production Developments in Continental Rayon Industry

Progress Being Made in Manufacture Under All Processes—Temporary Market Slackening

Special to TEXTILE WORLD

The extension of interests to types of rayon, other than viscose, has been particularly marked on the Continent of Europe, and the following article gives special prominence to this phase. Incidentally it will be noted that in most countries, temporary market depression has been encountered but that, as is true in Great Britain and the United States, no real doubt exists as to the permanency of the synthetic fiber field and the assured growth which lies ahead of it.

IN common with Great Britain and the United States of America, the rayon trade in the countries on the main Continent of Europe has suffered to some extent from the temporary depression in the industry. It is true that in some cases the falling off has not been very substantial but over the whole of the Continent there have been signs that the boom conditions of a few months ago were ending.

In an article on the situation in Europe which was published in the Annual Review & Forcast Number of TEXTILE WORLD at the beginning of the year, attention was drawn to the enormous effect of the American demand upon the European industry. Throughout 1927, Italy, as the most prominent example, was sending large quantities of rayon to the United States and also to Germany. The demand from these two countries has fallen away seriously in the last few months and it is interesting to note the change in the direction of Italian exports. From the following table, it will be seen that the total exports have not declined but that China has assumed a position formerly held by Germany and the United States:

ITALIAN RAYON YARN EXPORTS—JAN.-APRIL 1928 AND 1927

Destination	*1928*	*1927*
	Lbs.	*Lbs.*
China	2,452,727	818,329
Germany	2,450,324	2,442,871
United States	1,347,559	1,954,884
India	692,203	1,631,187

Exports from Holland have been well maintained and despite the fact that some reduction in price has apparently taken place, the trade with the United States has kept up remarkably well and during May was distinctly better than in April. Germany is still however Holland's best customer and shipments to both China and India have increased while those to Canada have fallen off somewhat.

Germany has expanded her export trade considerably and in the first half of this year exports totalled 7,125,580 lbs. against 3,918,640 lbs., in the corresponding period in 1927. The main trade is done with the United States, China, Poland and Czecho-Slovakia.

Development in Production

Developments in production have followed one another with bewildering rapidity throughout the present year. During the latter part of the life of the late Captain Loewenstein, industry throughout the Continent was full of rumors of impending changes and there is little doubt that the financier had the intention of gaining control of a large number of the most important units. His main interests were in the Tubize, Glanzstoff, Enka and Breda companies, in all of which he had a large measure of control, but with the exception of Tubize, he had not attained a position where his authority could be unchallenged.

Developments in the viscose side of the industry have been going on steadily but considerable prominence has been given to the acetate field, while cuprammonium has been further extended in Germany, and nitro-cellulose in France.

Acetate Progress

In the acetate field, the production position in Europe in the early part of the year was not very strong but since that time some important moves have taken place. The Dreyfus patents are operated by the Belgian and French Tubize companies and production has been pushed ahead as rapidly as circumstances would permit. The actual production at the Belgian works is unknown but the French company is now producing from 2,500 to 3,000 kilos. per day.

Another interesting development has been the commercial application of the Zdanowich patents worked on an experimental scale by the Consortium del'Acetose in Switzerland. This small company got into touch with the Lonza Power Co. of Basle and through them with the Dutch Enka Co., and it is understood that the latter will develop acetate on a large scale both in Holland and Switzerland. In another direction and with the aid of the Bozel-Maletra, the Lonza company became interested in La Setyl Francaise which will build a large acetate plant in France. This company is in turn connected with Le Setyl Italiana.

Meanwhile developments on the part of the Soc. pour la Fabrication de la Soie Rhodiaseta were pushed forward. This company, which is connected with the Usines du Rhone and with the French Comptoir, is now said to be turning out over 1,000,000 lbs. per year.

Finally, so far as France is concerned, there was formed the International Artificial Silk Co., which obtained its financial backing in the London market with the object of taking over a plant operated by the former Soie de Compiegne at Aubenton and also another one at Caroix. It was originally intended to devote attention entirely to the viscose process, but the general tendency of the market provided the board with a stimulus to develop the acetate process. They therefore proceeded to procure from the Basle firm of Syntheta A. G., the world rights to an acetate process. It was then announced that the Claroix plant would be devoted to acetate and subsequently the British rights were vested in the Alliance Artificial Silk Co. Another acetate and cuprammonium venture is Nova Seta A. G. of Arbon, Switzerland.

In Germany the Aceta G. m. b. H., which is associated with the Glanzstoff company and with the I. G. Farbenindustrie, met with very serious setbacks. For a time the works were to a large extent closed but it is understood that they are now fully working and that production has reached 1,000 kilos. per day and will be increased to 3,000 kilos. Acetate silk is also being made by the I. G. Farbenindustrie at their Leverkusen works, where a special process is being used. The British rights for this process are vested in the British Acetate Silk Corp., Ltd. It is also understood that a certain amount of acetate rayon is being produced by the Glanzfaden Co. at the Petersdorf works and progress is being made in the equipment of the Freiburg plant for the German Rhodiaseta Co.

Acetate production in Italy has now been actively commenced by the Soie de Chatillon and the plans of the company allow of an output of 3,000 kilos. daily. As mentioned above, the Setyl Italiana is also undertaking this process in a plant at Milan.

Developments in Viscose

It is impossible to refer in detail to the many developments which have taken place in the field of viscose production but brief reference may be made to the more important features. In Austria, the firm of V. Vinciguerra, in association with the Edlegarn-Spinnerei, is developing production and an output of 900,000 lbs. per year is expected. The Vienna firm of Gebruder Bader, whose plant is at Mahr Chrostau, over the Czecho-Slovakian border, is expanding rapidly and the present production of from 500 to 1,000 kilos. per day is to be increased to 2,000 kilos. The British rights to their process have been vested in the Yorkshire Artificial Silk Co., and arrangements have also been made for their development in both Germany and Japan. The largest producing plant in Austria is worked by the Glanzstoff concern and the capital has recently been increased with the object of almost doubling the present output which is said to be about 3,000,000 lbs. per year.

In Belgium, progress has been more in the consolidation of existing units than in the development of new companies. The most interesting feature has been the interest acquired by the Gillet group of Lyons in the new Fabriques d'Obourg which is a combination of the former Soie Artificial d'Obourg and the Textiles Belges. The Soc. Anon. Filsoietis, which was founded a year or so ago by cooperative interests, is being extended and a new company will be formed to increase pro-

duction to 2,000 kilos. daily of both cuprammonium and viscose yarns. The Viscose Belge has a plant at Alost and is turning out about 80 kilos. of hollow filament rayon per day.

New companies have appeared in France with extraordinary rapidity and in the following table a list of the more interesting of these formations is given:

NAME	PLANT	CAPITAL *Mills. of Frs.*	OUTPUT EXPECTED
Soie de Farnier		30	1½ mill. lbs.
Viscamine	Pontcherra	11	1½ mill. lbs.
Textiles Att. de Reims		1	5000 kgs per day
Soie de St. Etienne		3.6	
Textiles Chimiques du Nord et de l'Est	Valenciennes	100	
Soie Vauban		12	
Soie de Flandres	Armentieres		1000 kgs. daily
Soc. Nationale de la Viscose	Grenoble	150	
Soie Art. du Rhone	Neuville	22	2000 kgs. daily
Soc. Lyonaise le Fil Soyeuse		0.4	

La Soie de Valenciennes, which is controlled by the Dutch Breda Co. is extending its production from 3,000,000 lbs. to 5,000,000 lbs. per year, while the Soc. Lyonnaise de Soie Artificielle is increasing the present production from 2,640,000 lbs. per year to 4,400,000 lbs. Developments are still taking place in connection with the Soiries de Strasbourg and the present output of 1,000,000 lbs. will in due course be increased to 2,500,000 lbs. Artificial wool and rayon schappe is being turned out by La Soyeuse Francaise which has a plant at Rantigny and a considerable increase is anticipated. The Pellerin patents are used. Artifical wool production at a rate of 1,500 kilos. per day will soon be attained by the Soc. Francaise des Textiles Neo Soie et Neo Laine at their works at Irigny. The Soie Artificielle de Gauchy is engaged on the production of hollow filament rayon and the production is said to be over 1,000,000 lbs. per year.

Quite different from France is the case of Germany where consolidation and extension of existing units, primarily those directly or indirectly connected with the Glanzstoff company and the I. G. Farbenindustrie, have been the order of the day. Few if any new companies have been started during the year.

In Holland, the long lived monopoly of the Breda and Enka concerns is to be challenged by the Dutch Nyma Co., which is to erect a plant at Nymegen with a capital of 15,000,000 florins. Another proposal is to establish a plant at Rosendal. The latter proposition appears to be one made by financial interests only but the Nyma Co. has been founded by textile men in the Twentsche district, anxious to supply their own needs.

In Hungary, the Sarvar company has been restarted with the aid of the Tubize company in Belgium. In Italy the viscose output of the Soie de Chatillon, which in 1927 amounted to 11,500,000 lbs., is expected to be increased this year to 15,000,000 lbs. It is possible however that the trade situation may alter this. The Snia company produced 28,500,000 lbs. in 1927 and is now turning out 100,000 lbs. daily. There has been no attraction towards the formation of further new companies.

In Poland, good progress has been made in viscose production by the Tomaszow plant. Output has now reached 6,000 kilos. per day and will be increased to 10,000 kilos. A new plant backed by the Glanzstoff interests is to be erected in Roumania and it is also understood that proposals are on foot for the establishment of a plant in Jugo-Slavia. In Russia, dissatisfaction has been expressed at the ruling prices and proposals are on foot for the establishment of plants in competition with the existing one at Mytischtsi. It is understood that mills will be erected in Ukrainia and another proposal is to establish with the aid of the Soiries of Strasbourg, a large plant in Leningrad.

In Spain the production of the Seda de Barcelona, which is associated with the Dutch Breda Co., has now reached 5,000 lbs. daily. The Fabrica de Sedas Artificales Valdenoceda is now turning out 1,200 lbs. daily and will double this. In Sweden the only plant is that operated by the Aktiebolaget Svenskt Konstsilke and the output is now 600 kilos. daily. In Switzerland new developments appear to have affected the acetate process more than viscose. Production of the latter has nevertheless been increased and the Swiss Viscose Co. has now reached 10,000 kilos per day.

Collodion and Cupra Processes

In the collodion and cupra processes, progress has also been made. The Tubize company in Belgium has now reached a substantial production of the former. In France the S. A. La Soie de Lille has recently been formed with a capital of 26,000,000 francs to work the collodion process in premises at Marquette-les-Lille and operations will probably commence in less than two years time. A certain amount of cupra silk is also being made by the Soie Artificielle d'Izieux and 800 kilos. per day being turned out by the Cuprotextile which is the French subsidiary of the German Bemberg company. Collodion silk is also being made by the Rennes Artificial Silk Co., a company floated in London this year, with the object of taking over a plant formerly worked by the late Count de Chardonnet in Rennes.

In Germany the output of cupra silk by the J. P. Bemberg Co. has now reached 10,000 kilos. daily but such is the popularity of the product that steps are being taken to increase this to 19,000 kilos. daily. A certain amount of cupra silk is being made by the Glanzfaden A. G., and the Holkenseide Co. which is controlled by Bemberg is also continuing to produce this. Cupra is made by Fr. Kuttner A. G. of Sehma and by the I. G. Farbenindustrie but probably the only collodion plant is that operated by the small Kunstseidefabrik Schwetzingen of Mannheim.

In Hungary marked progress in the production of collodion rayon has been made by the Magyarovar company and in Italy the Seta Bemberg has now reached a production of 1,000 kilos. daily. The collodion process is not used in Italy. In Poland collodion silk is being produced by the Tomaszow factory at the rate of 3,000 kilos. daily and this will be increased to 4,000 kilos.

Consumption Must Increase

It will be gathered from the above summary that production in Europe will in the course of the next few years be on a scale which will require a vastly increased world consumption if profits are to be made. It should however be understood that in several cases the estimated production may never be reached and that in quite a number of cases, it is more than likely that the hopes of the promoters will be dashed before even the commercial production stage is reached. Apart from this however it is obvious that consumption must be increased and the general belief based partially on past experience and partially on the fact that as yet rayon forms a comparatively small part of the total textile production, is that for many years there will exist a growing demand for the fiber.

It is realized however that from time to time there will be temporary periods when supply overtakes demand. It is generally supposed that Europe is passing either through or is entering into one of these periods now. It would appear however that the surplus stocks are in most cases those in the coarser deniers where demand is lagging. In the finer deniers and more especially in the multi-filament yarns there is still a keen demand and those companies which have been enabled to produce the qualities and the degree of fineness in demand have been well employed. There is certainly no reason to believe that there is any serious depression in Europe.

An all-round reduction in acetate silk prices has taken place but the reduction is not commensurate with that reported from America and while this cannot be said to be solely due to reduced costs, the falling off in demand for this particular type is probably only temporary. It is due in part at least to the keen competition of the finer types of viscose and the cupra yarns. Furthermore there was more room for reduction in prices in acetate than in viscose. Viscose prices have on the whole remained remarkably steady and in this connection it is interesting to note that according to the latest figures available here, there has been only a small reduction in the average prices of yarns sold by European companies to the United States.

Rayon Notes From France

The Soie de Claroix has been formed with a capital of 17 million francs in 500 franc shares of which over 90% will be held by the International Artificial Silk Co. The International Artificial Silk Co. was formed several months ago in London and they are operating a viscose plant at Aubenton in France. Later they purchased from Syntheta of Basle the rights to an acetate process which was to be used at Claroix in France. The new Soie de Claroix will presumably take over the acetate plant. It is also understood that a similar arrangement will be made in connection with the viscose plant at Aubenton and that subsequently the International Co. will be largely a holding concern. They have a large interest in the new Alliance Artificial Silk Co., which will work the acetate process in Britain, and possibly later, in America.

* * *

The production of the French Tubize Co. is now said to be from 2,500 to 3,000 kilos per day of acetate rayon.

* * *

The profits of the Soc. Ardechoise in 1927 amounted to 2,947,923 francs against 3,536,079 francs in 1926. The ordinary dividend is reduced.

* * *

It is understood that the Givet Viscose Group, which controls several plants allied to the French Comptoir, is forming a new 150,000,000 franc company for manufacturing artificial silk into woven and knitted products.

British Rayon Producers Regard Slump as Temporary And Push Expansion Plans

Production Increase Greater than That of Consumption But Does Not Interfere with Development of Industry

By J. Guthrie Oliver

The following survey of the situation in the British rayon industry brings up to date the information published in previous issues of TEXTILE WORLD. It is particularly interesting to note that that country has experienced one of the gaps where production overtakes consumption, inevitable in the development of a new industry; but that producers there recognize this situation as merely a temporary one. The information given herewith regarding the progress of individual companies is based on personal investigation conducted by the author.

AFTER an exceptionally good year in 1927, production of rayon goods in Britain began to overtake demand in the earlier part of 1928 and as a result there has been and still is, a temporary slump in certain deniers and classes. While it is difficult in the absence of statistics to come to any definite conclusions, it would appear that demand has not fallen away to any marked extent but that the increase in the rate of production has been greater than the consumption. Under these circumstances, the slump is regarded as purely temporary and has not in any way interfered with plans for development of the industry.

The leading producers in this country give no indication at any time of the total weight of their production, and estimates supplied by smaller producers are often rather optimistic with the result that, speaking generally, we are denied a knowledge of the situation such as is provided in the United States of America. We are obliged therefore to fall back upon the details published of the amount of rayon yarn subjected to excise by the authorities. In the following table a detailed summary of the position since the imposition of the duty in July, 1925, is shown. These figures, it should be understood, are a guide to sales rather than actual production. During 1926 the excise figures were probably considerably lower than the output. During 1927, more especially in the first six months, the reverse was the case and from the middle of 1927 until the end of the first quarter in 1928 it may be taken that the amount excised represented the production more or less accurately. During the second quarter of 1928 it is likely that the amount excised was below the production and that some stocks accumulated.

BRITISH PRODUCTION OF RAYON 1925 TO 1928

		Lbs.			Lbs.
1925	3rd quarter.....	7,110,921	1927	1st quarter.....	7,765,229
	4th quarter.....	6,672,371		2nd quarter.....	8,742,583
1926	1st quarter.....	6,081,395		3rd quarter.....	10,942,108
	2nd quarter.....	5,951,953		4th quarter.....	11,352,547
	3rd quarter.....	6,722,074	1928	1st quarter.....	12,550,391
	4th quarter.....	6,732,129		2nd quarter.....	12,643,283

It will be noted that the output or at least the sales of rayon yarn gradually fell from July, 1925, to June, 1926, but that since that time there has been a gradual improvement. It should be remarked however that the improvement in the last quarter is not commensurate with the increased and increasing productive capacity of the country.

Foreign Trade

The export trade showed substantial recovery during 1927 but although a better average price has been noted, there has been some falling off in the total weight sent abroad when comparison is made between the first half of 1928 and the second half of 1927. To some extent, this may be seasonal.

Imports of yarn have shown a tendency to increase while the increase in the importation of manufactured goods is not such a marked feature of the trade as it was a year ago. The explanation of this probably lies in the methods of calculation of duty. The customs duty on yarn is by weight while that on goods is ad valorem. As a consequence of this, on a falling yarn market it is more economic to import manufactured goods to Britain and, vice versa, when the yarn market is hardening or steady, it is usually more attractive to import yarn.

The export trade in cotton and artificial silk mixtures and wool and artificial silk mixtures has shown remarkable expansion, the market of outstanding interest being Brazil which country took from us no less than 5,934,022 yds. of cotton and rayon mixtures in the first half of 1928 against only 1,781,228 yds. in the corresponding period of 1927 and 879,857 yds. in 1926. Exports of rayon hose have also expanded and during the first seven months of the year 506,588 doz. prs. were sent abroad against 449,975 doz. prs. in the corresponding period of 1927. Exports of silk hose have declined.

Progress Made by Industry

In turning to the progress made in the British industry it is perhaps advisable to deal with the subject under the heading of the three leading processes, viscose, acetate and cuprammonium. The collodion process is not now an economic proposition in this country and apart from possible small experimental plants it is now entirely out of use.

The Viscose Process

The entire market in British viscose yarns is dominated by Courtaulds, Ltd., who produce and sell at least three quarters of the entire output of this class of rayon. The price situation is therefore entirely controlled by Courtaulds, Ltd., who have adopted a policy of stability first. No official price lists are issued in this country but it is known that since June 1926 no major alteration in prices has taken place.

We are however slowly moving away from any fixed lists and the market in rayon is gradually assuming the bargaining features which characterize the markets in other textile yarns. As a result of this, though Courtaulds have in the main followed a very steady course, there has been considerable cutting in various directions.

Several of the new producers committed the serious mistake of bringing their yarns on the market before they had reached a high standard of quality. In any case it is obvious that yarns which had not gained a reputation should in the first place be sent to the weaving industry either for home or more likely the foreign trade. The result of this was that the weaving trade was over-supplied with yarns during the present year and the position is still one in which supply is greater than demand. This applied however more particularly to the standard weft yarns. The supply of warp yarns was for a considerable time unequal to the demand and especially so in the case of warp knit yarns. The leading producers made strenuous efforts to supply the keen demand and have now succeeded and have also reduced the prices by amounts varying from 2d. to 6d. per lb. Other producers, realizing that the most profitable business was to be done in warp knitting yarns, also pushed forward their plans and some very good material is now being turned out which is competing with Courtaulds. Throughout the year the hosiery trade has been better placed than the weaving trade and demand for fine grade yarns and especially the multi-filament yarns, such as it was difficult for new producers to supply, has been uniformly good.

As mentioned previously in this survey, the depression is regarded as temporary and there has been no slackening in plans for the extensions of existing units and for the equipment of new plants by entirely new companies. Perhaps the boldest of these plans is that of Courtaulds, Ltd., who intend to build another large plant right in the heart of the Lancashire cotton trade. Negotiations have not yet been completed but at the time of writing it seems likely that the site chosen will be one at Bamber Bridge, near Preston.

During the year the large plant to be operated by the Branston Artificial Silk Co. at Burton on Trent has been brought into operation. The plant is one of the finest in the country and probably in the world. It is expected that the production will reach four tons per day of high quality rayon before the end of this year and already plans are in hand for immediately increasing this to ten tons per day.

The British Acetate Silk Corp. (to which further reference is made under the heading of the acetate process) has now reached an output of over 17 tons of viscose silk per week and the machinery is being

rapidly installed for the further production of another 10 tons weekly. The works are those formerly operated by the Bulmer Rayon Co. and are situated at Stowmarket in Suffolk.

The production of the British Enka Artificial Silk Co. at its Aintree plant has been increased and is now rapidly approaching the estimated output of 18,000 lbs. per day.

The latest information available in regard to the British Visada Co. is to the effect that production is now at the rate of 20,000 lbs. weekly. The company has met with many difficulties and plans are under consideration for the raising of further capital.

One of the most successful companies has been Harbens, Ltd., who are now producing at their plant in Golborne, Lancashire, 18 tons of viscose yarn per week. A substantial profit was made on the last year's working and an increase in the capital has been made in order that the output may be increased to 25 tons per week. It may be noted that Harbens, Ltd., in return for financial assistance secured in the past from the Branston Artificial Silk Co., have allowed the latter to have all available information in the completion of their plant. The arrangement has been of immense benefit to Branston.

During the year the International Artificial Silk Co. was formed in London with the object of taking over the Aubenton and Claroix plants from the Soie de Compiegne in France. The original intention was to produce viscose silk at both plants but it was subsequently decided, in view of the increasing importance of acetate rayon, to devote the Claroix mill to acetate, keeping Aubenton for viscose. Further developments in connection with this company are noted under the remarks on the acetate process.

The small plant operated by the Kirklees Artificial Silk Mfg. Co. and producing about three tons of viscose per week, has been taken over by the Rock Investment Co., which also controls the Branston works. The output is to be increased to 12 tons per week and for this purpose a new company with a capital of £500,000 was formed under the title of Kirklees, Ltd.

Another entirely new venture is the North British Artificial Silk Co., which plans to produce 29,000 lbs. of viscose yarn weekly at a plant at Jedburgh in Scotland. This plant is not yet in operation.

The Nuera Artsilk Co. is producing a certain amount of viscose yarn by the Sindl-Maurer process but interest is mainly centered on the Lilienfeld process which this company is to operate in conjunction with Courtaulds and Glanzstoff. Commercial production has not yet commenced but it is understood that when the yarn is brought on the market substantially higher prices will be asked than is the case with the ordinary viscose. The general properties of the yarn are well known and there has been nothing new disclosed. Lancaster manufacturers are now trying out 150 denier yarns with 120 filaments.

The Rayon Mfg. Co., which was forced into voluntary liquidation in the early part of last year, has been reorganized and production is now over 11 tons per week.

One of the biggest new flotations is the Scottish Amalgamated Silks, Ltd., which was formed with a capital of £2,000,000 to take over several plants and also the whole of the plant operated by the former Scottish Artificial Silks, Ltd. Production of yarn will be commenced shortly at Kirkcudbright but in addition a very large plant is being built at Alexandria, near Dumbarton. It is intended to produce over 2,500,000 pounds of rayon and staple fiber per year, and in addition weaving and knitting and also the spinning of cotton and staple fiber yarns will be carried on.

Sunsheen, Ltd., the only producer of rayon in Northern Ireland, has met with many difficulties but during June of this year they produced 47,000 lbs. of yarn, about one-half of the output originally planned.

An output of well over 11 tons per week has been reached by the Western Viscose Silks Mills, Ltd., at Bristol.

The Yorkshire Artificial Silk Co. has been formed to work in England the processes patented by Gebruder Bader of Czecho-Slovakia. Production at the Brighouse plant has not yet begun but it is intended to have an output of 22,000 lbs. of yarn and 12,000 lbs. of staple fiber per week.

The British Breda Silk, Ltd., has been formed and it is understood that a large plant will be erected for the production of viscose rayon by the Breda patents in Holland.

Progress has been made in the production of hollow filament viscose silk by Kemil, Ltd., and the output at the Peterboro plant is now over 10 tons per week.

The Acetate Process

Reference was made above to the activities of the International Artificial Silk Co. and in this connection it might be said that in addition to the operations in France, they recently floated a British subsidiary under the title of Alliance Artificial Silk, Ltd. This new company has acquired the British and American rights to a process for the production of acetate silk from Syntheta, Ltd., of Basle, Switzerland, and a plant capable of producing 5 tons daily is to be built at Lowestoft in England. It will of course be some time before this can be brought into operation.

After many difficulties the Apex Artificial Silk Co., which was formed in 1925, has now commenced production on a small scale.

Probably the most important event of the year has been the establishment of the British Acetate Silk Corp. under the managing directorship of Sir William Bulmer. The works at Stowmarket have been producing acetate rayon for some time and the output is being pushed forward very rapidly and should reach the large estimated total of 50 tons weekly in the course of the next 12 months. The company has secured the rights to a subsidiary process, which has been proved to materially reduce the cost of production and which is being operated in Germany by the I. G. Farbenindustrie at their Leverkusen works.

Throughout the year the productive capacity of the works of British Celanese, Ltd., has been gradually increased. No official figures are given in regard to output but at the present time, this is said to be about 10,000,000 lbs. per year.

The Cellulose Acetate Silk Co. was formed as an offshoot of the Non-Inflammable Film Co. and is engaged on the erection of works at Lancaster for the production of acetate rayon at a rate of 8 tons per day. Bertrand R. Clarke is interested in this company.

Progress has also been made by Courtaulds, Ltd., in the production of acetate rayon but the company follows a policy of secrecy which results in nothing being definitely known in regard to output. It is reported that this is to be very rapidly increased.

Another producer of acetate silk is Nelsons Silks, Ltd., a private company engaged in the erection of large works at Lancaster.

Finally it is as yet unknown whether the new Union Artificial Silk Co. which is to build a large plant at Nottingham will engage in acetate or viscose production.

The Cuprammonium Process

The cuprammonium process is not very extensively used in Britain but it is likely that in the near future a great change will take place. The only large producers at the present time are Brysilka, Ltd., of Apperley Bridge, near Bradford, whose output is at the rate of 1,750,000 lbs. annually.

The British Bemberg Co., a subsidiary of the German company of the same name, will shortly erect a large plant in this country and a public issue of shares and debentures is being made for the purpose.

Linium Products Syndicate, Ltd., has been producing yarn, horsehair and artificial wool for some time in premises at Nottingham on the Foltzer principles and it is probable that the company will be considerably developed in the near future.

The outlook for cuprammonium yarns is good.

Rayon Notes From Britain

The British Celanese Co. has made price reductions which amount to 6d. per lb. on 75 and 120 deniers, 9d. per lb. on 150 denier and one shilling on 100 and 140 denier. In addition there is a flat rate reduction of one shilling per lb. on all warp yarns. The reduction is due in part to the growing competition of Courtaulds' and in some measure to the British Acetate and other new producers.

* * *

The British Acetate Silk Corp. has opened up new central offices at Moorfields House, Moorfields, London.

* * *

The Boyeux Silk Sizing Co. has been formed with a capital of £35,000 to work a new sizing process and it is understood that the British rights will be obtained by the Alliance Artificial Silk Co. The latter company will presumably also have the American rights and it is expected that the International Artificial Silk Co. will work the process in France.

* * *

The Board of Trade returns for the month of July have been issued and the usual summary is given below:

	July, 1928	June, 1928	July, 1927		July, 1928	June, 1928	July, 1927
Imports of yarn in lbs.	296,053	242,124	231,108	Exports of yarn in £..	207,674	170,699	156,858
Imports of yarn in £..	67,053	52,590	44,215	Imports of Mfrs. in £.	435,236	422,982	384,404
Exports of yarn in lbs.	879,396	699,379	753,683	Exports of Mfrs. in £.	661,300	548,498	450,689

* * *

The amount of artificial silk yarn subjected to excise duty in the first six months of 1928 was 25,193,674 lbs. against 16,507,812 lbs. in the corresponding period of 1927, and 12,033,348 lbs. in 1926. The estimated consumption is 22,500,000 lbs. against 19,750,000 lbs. in 1927 and 9,650,000 lbs. in 1926.

Use of Staple Fiber and "Wool Substitutes" Continues To Expand in British Textile Trade

Lancashire Manufacturers Show Increased Interest in Its Possibilities—New Fiber for Blending With Wool

Special to TEXTILE WORLD

MANCHESTER, ENGLAND.

STAPLE fiber continues to be used in increasing quantities and for a variety of purposes by cotton and worsted manufacturers. Its use among the former is a comparatively new feature and one of the greatest interest as there are undoubted potentialities. In Britain, Lancashire manufacturers have been induced to take an active interest in the cut fiber and recently there have been produced fabrics of 100% staple fiber which are retailing remarkably well at extremely low prices. Actually sales are taking place at around 3/- per yard for fabrics which compare with spun silk in many ways. Manufacturers have been faced with the difficulty that the tensile strength of the fiber in the wet state is extremely low and as a consequence complaints have been made in regard to the laundering. Several makers have given up the attempt for this reason. There is however a very marked improvement in the strength of the fiber now being placed on the market by the leading producers and it is hoped that this trouble will very shortly be overcome. The latest cloths which are made from 100% staple fiber of the "Fibro" type supplied by Courtaulds, Ltd., are claimed to wash extremely well. They are very light and durable.

Several firms are now turning out cloths of the crepe de chine type with a cotton warp and a staple fiber weft which have a dull luster and a very soft handle and which can scarcely be distinguished from the silk and rayon crepe de chines now on the market, over which they have of course a very distinct advantage in price.

An increasing amount of staple fiber is being spun both alone and with cotton in the Lancashire area and sold to the hosiery trade where fine counts are in demand. A rayon and cotton spun yarn of about 35's cotton count should cost about 5/- per lb., and a fabric made with the weft of this material and a cotton warp should cost about 1/- per yard, to produce. A similar cloth made from continuous filament viscose weft of 150 denier and similar cotton warp would cost 1/3 to 1/5d. Once satisfactory results are obtained with staple fiber yarns there should be good openings in the export markets. Several manufacturers are now turning out spun rayon and cotton boucle yarns, and the made up fabrics have the feel and appearance of wool.

Velvets are expected to be very popular this next season and staple fiber offers considerable attraction. Lancashire manufacturers are turning out velvets with cotton back and staple fiber pile which are selling particularly well in France to a class which cannot afford real silk velvet.

Use in Wool Trade

In the worsted and woolen trades of Yorkshire the actual weight of staple fiber used is probably less than in Lancashire. This is due to the fact mentioned above that Lancashire is inclined towards the 100% staple fiber fabric while Yorkshire rarely uses more than 10% in any cloth. The worsted manufacturers are the chief users of the specially prepared staple fiber but large quantities of rayon waste which is often incorrectly termed staple fiber are used in the woolen trade.

Hollow Filament Possibilities

Staple fiber is very often worked up into attractive fabrics of the crepe de chine type with fine worsted warps, one of the most important features being the better covering power and the consequent increase in warmth provided. It has been suggested that a hollow filament staple fiber might with advantage be introduced. Hollow filament rayon is known to have a substantially better covering power than ordinary continuous filament viscose and though the staple fiber offers some attractions, one of the difficulties in the way is the thick diameter in the single filament. Formerly cloths with very special handle were obtained with botany warp and cotton weft and the introduction of staple fiber in the place of the botany has been found successful. The cloths made in this way have been used for underwear and linings.

Use in Suitings

Staple fiber has secured a good hold in the suitings trade. It has just sufficient luster to give a superior appearance to the cloth while there is a touch of color which adds to the selling power. The staple fiber is mixed with wool prior to the spinning process, the effect of the admixture in the finished cloth being to provide the appearance of a much better wool than is actually being used. "Bloom" effects are produced on what would otherwise be plain dyed cloths, e. g. browns and navies.

In the tapestry trade, staple fiber is finding an increasing outlet and Yorkshire tapestry manufacturers have been successful in combining a cotton warp with a staple fiber weft of a fairly coarse count. The cross-dye effects show up to advantage. A staple weft, made from rayon waste, is employed by counterpane makers with successful results, and the finished product can be sold at a price which is of considerable advantage when competition is keen. The washing qualities have been found to be fairly good.

A very large use is being made of staple fiber in the spun silk trade which is centered around Brighouse.

New Companies Enter Field

It is noticeable that several of the newer rayon producing companies intend to devote a portion of their plant to the production of staple fiber and among these might be mentioned the Yorkshire Artificial Silk Co., who are equipping a plant in Brighouse itself and will produce, when in full production, a considerable quantity of both staple fiber and continuous filament rayon. Another company which intends to turn out staple fiber in large quantities is Scottish Amalgamated Silk Ltd. Apparently the primary object of this concern, however, is to take advantage of the growing demand for staple fiber fabrics produced on cotton machinery either as 100% cloths or blended with cotton.

More Even Dyeing Claimed

One of the great arguments used by the advocates of staple fiber is that more evenness is obtained in dyeing, with the result that the unsightly "bars" which are often seen on imperfectly finished or processed artificial silk goods are usually absent in staple fiber materials.

A New "Wool Substitute"

Among recent attempts to introduce a wool substitute or at least a fiber which will blend with wool in an appreciably large percentage and thus reduce the cost is "Blendya" fiber which has now been introduced to Britain. This fiber has many of the characteristics of "Nufi," a product which has been described previously in TEXTILE WORLD. It is made from a South American grass. It is claimed that it grows stronger when wet as in the case of cotton and that it will not shrink. On the subject of dyeing, it is understood that it only takes about 25% of the time occupied in dealing with an all-wool fabric. It is usually mixed with fine wools and used in the hosiery and worsted trades, where it considerably cheapens the cost of the finished garment. Two color effects are obtained by cross-dyeing.

The flannel trade has naturally been interested in this introduction and two methods have been used. The first is to use noils of the fiber and blend these with wool, the other to blend the fiber with botany noils. There are many other trades which are experimenting with the fiber and naturally the cheap overcoating industry figures prominently.

In the worsted trade it has been found that the fiber content should not usually exceed 60% of the total and may in many cases be brought right down to about one-third. It is usually blended with 60's or 64's wool tops and it is said to be easy to draw and can be spun without trouble on the cap and fly frames. In some cases as little as 10% of the fiber is used with merino tops. From this a twist yarn is spun and a colored effect is obtained by dyeing the wool and thus leaving the fiber (which is only touched by cotton dyes) in the white state.

In the piece goods trade, up to 2/48's worsted counts have been produced with the blended fibers. Two methods are adopted: (1) Either the fibers are blended, yarn is spun and the piece woven in the gray, being afterwards cross-dyed, or (2), the fiber is dyed a dark shade, milled and cross-dyed before blending with the white top, then spun, woven and dyed in the piece, using wool dye only.

International Rayon Cartel: Its Ramifications and Its Possible Effects Upon the Trade

Working Agreement Among Glanzstoff, Courtaulds And Snia Affects Most of Large Producing Units

***Editor's Note:** The connections shown in the diagrams accompanying this article are based on the latest information obtainable, but no responsibility can be accepted for inaccuracies.*

IT is now approaching a period of two years since the official announcement was made of a close working agreement among the Vereinigte Glanzstoff Fabriken of Germany, Courtaulds Ltd. of England, and the Snia-Viscosa of Italy. The industry generally has been denied any details of the terms of the agreement and surprisingly little information has been obtainable in any shape or form. Under the circumstances, it is only possible to give in general terms the chief effects of the formation of the Cartel and to show in diagrammatic form how it has extended until directly or indirectly almost all of the large producing units have been incorporated.

The Cartel has often been described as the Viscose Cartel or Agreement but this title is somewhat misleading as the various companies, both parent and subsidiary, are engaged in processes other than viscose and it is by no means unlikely that one of the reasons in the minds of those responsible for the agreement was that of obtaining control of every kind of rayon process.

Bearing on Cupra Process

So far as viscose is concerned, the measure of control exercised by the Cartel is obvious but it is interesting to note that cuprammonium was almost exclusively in the hands of the Bemberg Co., which in its turn was controlled by the Vereinigte Glanzstoff. It is not impossible that when the agreement was formed, Courtaulds, Ltd., had in view the possibility of sharing in the profits which were likely to be derived from the cupra process.

During the last few years this process has developed rapidly and, owing to comparatively low costs of production, more especially in fine denier and multi-filament yarns, the future may be considered very bright. The Bemberg and Glanzstoff companies jointly formed the American Bemberg Corp. which has a very promising future. In Italy, the Seta Bemberg was formed and in France "La Cuprotextile." In so far as Britain was concerned there were rumors for some time that either the Bemberg Co. itself or its subsidiary, Holkenseide, would build a plant. It was also suggested that Courtaulds might get the sole sales rights in Britain if the policy of importation were continued and no plant built in Britain. During 1928 however the position was such that the practicability of establishing a plant in the consuming country became more real. This was due primarily to the increased consumption of Bemberg silk in Britain and partially to the effect of a duty by weight* on imported yarn and also to the fact that the British Government was making rating proposals which rendered the establishment of new industries a more attractive proposition. Under these circumstances, there was recently formed British Bemberg Ltd., and it is understood that a large plant will be erected in the near future.

Relation to Acetate

The position of the International Cartel in relation to the production of acetate rayon is more complicated. In this case, the leading producers are the Celanese group and although it is generally understood that efforts have been made to come to some agreement between Celanese and the International Cartel, the latter have so far as is known, pursued a policy of strict independence.

The position was made still more complex by the activities of the late Capt. Loewenstein who through his International Holdings & Investment Co. not only controlled the Tubize Co. in Belgium but was rapidly obtaining control over other important units. The Tubize Co. works the Celanese or Dreyfus patents under an agreement which has been a constant source of friction. This agreement allowed the Tubize Co. under certain conditions to exploit the process in France, Germany and other countries within a number of years. The French Tubize Co. was started under this agreement but action was taken by the Celanese Co. to stop the development of the process in other countries on the grounds that the conditions of the agreement in so far as the period in which the plants had to be started, had not been fulfilled. The courts decided against Celanese and at the moment the Tubize Co. apparently has the right to exploit the Dreyfus patents in Germany and other countries.

In another agreement, the Celanese companies were to supply Tubize with raw cellulose acetate and for some reason or another these supplies were either stopped or reduced, thus materially interfering with the progress of the Tubize Co., which was forced to build a special plant for the purpose. It will be seen that the position is such that in the

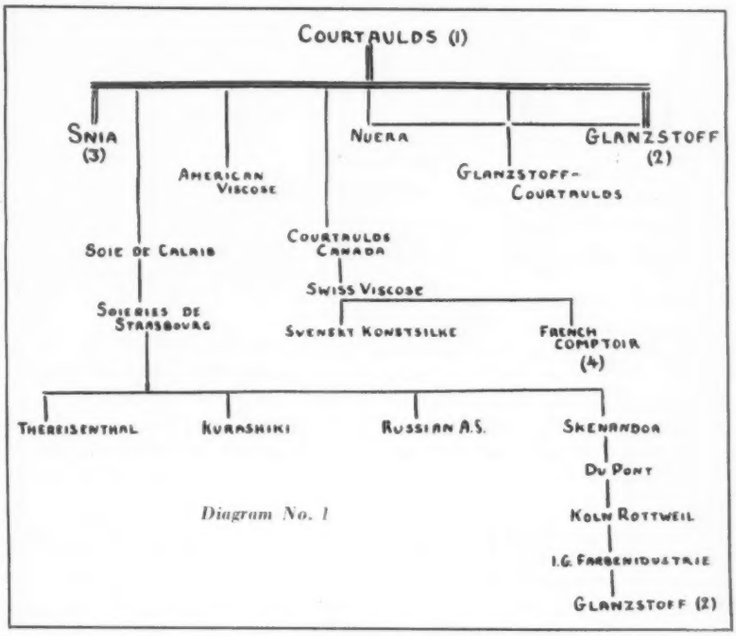


Diagram No. 1

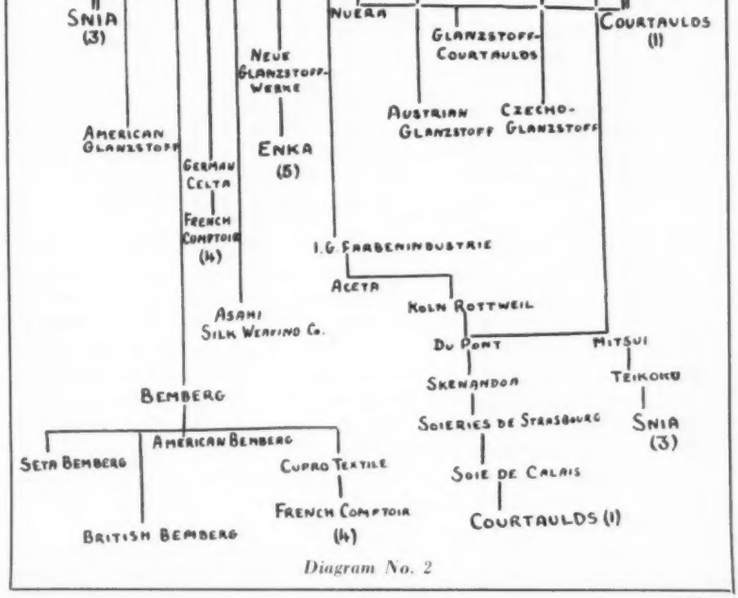


Diagram No. 2

* This duty becomes proportionately heavier as the price of rayon falls.

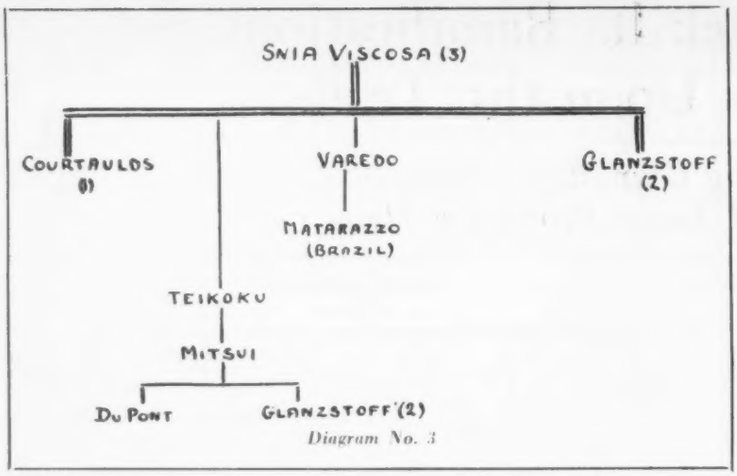


Diagram No. 3

course of time and unless another legal decision is made by the courts, the Tubize Co. will be in a position to exploit the Dreyfus patents in Germany, presumably either directly or indirectly with the aid of the Glanzstoff Co.

In the meanwhile the production of acetate silk in Germany is not large. Courtaulds, Ltd., of England are producing a certain quantity but they have not entered enthusiastically into the production. The Enka Co. which, as will be shown later, is very closely connected with the Cartel, has launched out in another direction and with the aid of the Lonza Power Co. in Switzerland has secured the rights to the Zdanowich process for the production of acetate silk. Snia Viscosa, having been busily occupied in technical alterations to their viscose plant which they have been enabled to make as a result of collaboration under the agreement with Courtaulds, Ltd. and Glanzstoff, have not yet decided to produce acetate on a commercial scale.

Avoidance of Price Wars

Apart from the various processes, the International Cartel was formed largely for the reason that avoidance of price wars was a primary necessity for the advancement of an industry where large sums of money were required for research. It has been one of the chief arguments of the rayon producers that stability in prices was obtainable to a degree which was completely absent from dealings in other textiles dependent upon seasonal harvests for the raw material. During the slump of 1926 this claim was reduced to almost nothing. Prices were anything but stable and stocks of yarn were lying about all over the world. Moreover, manufacturers would not give forward orders for the simple reason that they felt that at anytime a further reduction in price might be obtainable.

Under these circumstances, business became very difficult and the leading producers, realizing that such a condition would recur from time to time, dealt with the matter boldly by the formation of the now famous International Cartel.

What has been the result? We have passed through and are still indeed passing through another temporary slump, caused partially by over-production, mainly of the coarser grades. Prices have on the whole remained remarkably steady. It is true that in some cases concessions have been made but it is an astonishing fact that the International Cartel has thus far at least succeeded in holding all its members together and has stabilized the price of rayon yarn throughout a somewhat trying year.

Limitation of Markets

So far as the delimitation of markets is concerned, the policy of the Cartel is by no means clear. To outward appearance it would seem that the position is no different from that prior to the signing of the agreement. It is obvious that the members of the Cartel will not enter into any phase of acute competition but there is no reason to believe that the markets of the world or even the home markets of the various companies have been apportioned under any hard and fast rules.

One further result of the Cartel has been that the great financial resources of the Courtauld company have been utilized to some extent for the development of the industry on the Continent of Europe. It is known for instance that Courtaulds and Glanzstoff have a substantial holding in the Snia Viscosa company, and in other directions the British and German companies have rendered assistance which will result in the production of better grade goods by certain companies who were unable through their own capital resources to make the extensions required.

Bearing on Raw Materials

There is no evidence that the International Cartel has in any way exercised an influence in the field of raw materials. It is true that the Glanzstoff company are associated with others in the production of machinery but there is no direct evidence that the Cartel as a whole have used their strength to force a reduction of prices of wood pulp, cotton linters or of chemicals. The subject is one which involves the vexed question of the international relationship of the large chemical producers and in particular that of the rapprochement of the I. G. Farbenindustrie of Germany and the Imperial Chemical Industries, Ltd., of Britain. This has not yet taken place to the extent where full co-operation can be anticipated.

Ramifications of Cartel

In order to show the ramifications of the Cartel it has been necessary to deal in diagrammatic form with each of the members in detail. It is possible to prepare a diagram showing the whole of the connection at one glance but owing to the extensions which have been made, the reading of this diagram would become a great labor. If, therefore, readers, when they have traced the connections of for example, Courtaulds down to the French Comptoir, will then turn to the diagram showing the connections of the French Comptoir, they will be able to see the connections of the latter with greater ease than would be the case if an attempt had been made to combine the whole in one.

Diagram No. 1—Courtaulds

In Diagram No. 1, the main connection between Courtaulds, Snia and Glanzstoff is plainly shown by a heavy line. Another connection between Courtaulds and Glanzstoff is shown through the arrangement with the Nuera Co. for the development of the Lilienfeld process. In addition, the two parent companies have formed the Glanzstoff-Courtaulds Co. which is building a plant at Cologne. The further Glanzstoff connections are shown in Diagram No. 2 and the Snia connections in Diagram No. 3.

Direct Courtauld connections include The Viscose Co. in America, Courtaulds in Canada, and the Soie de Calais. Through the latter there is connection with the Soiries de Strasbourg and this leads to a world-wide cover including the Therieisenthal in Czecho-Slovakia, the Kurashiki in Japan, the new Russian Artsilk Co. at Leningrad and the Skenandoa Rayon Co. in the United States. The latter is in some measure connected with the Du Pont company and thus with the Koln Rottweil in Germany, the I. G. Farbenindustrie and back to the Glanzstoff concern. Courtaulds are also indirectly connected with the Swiss Viscose Co. and thus with the Svenskt Konstsilke in Sweden and also with the French Comptoir, whose further ramifications are shown in Diagram No. 4.

Diagram No. 2—Glantzstoff

The Glanzstoff Co.'s connections in Germany, with the exception of the important I. G. Farbenindustrie and the Bemberg links, have been

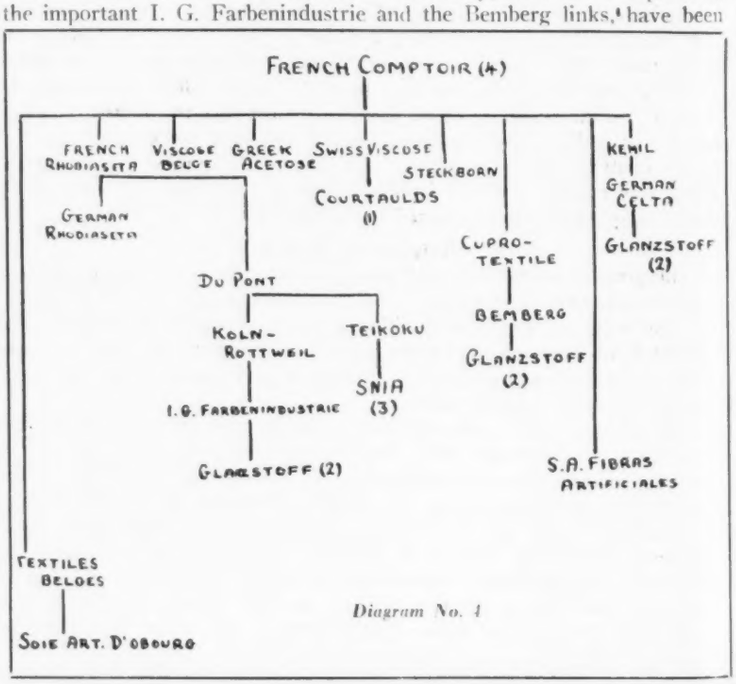


Diagram No. 4

omitted from Diagram No. 2 for the sake of clarity. The main link with Snia and Courtaulds is shown by the heavy line, and the Nuera and Courtaulds-Glanzstoff Co. connections previously mentioned are also shown. The direct subsidiaries in America, Austria and Czecho-Slovakia are easily disposed of and the newly reported Roumanian connection may also be mentioned. The arrangement with the German Celta Co. for the production of hollow filament silk brings the Glanzstoff Co. into connection with the French Comptoir (see Diagram No. 4). Through the Neue Glanzstoffwerke, Glanzstoff is connected with Enka whose ramifications form our fifth diagram. Through the I. G. Farbenindustrie we reach the Aceta Co. and also the Koln-Rottweil and thus by a long line of connections back to Courtaulds. Through an ill defined connection, the Du Pont and the Glanzstoff companies are interested in the Mitsui Co. in Japan which is now producing artificial silk, and thus with the Teikoku Co. and back again to Snia Viscosa.

Diagram No. 3—Snia Viscosa

The Snia Viscosa connections are comparatively simple. The main line connecting with Courtaulds and Glanzstoff is shown and the direct connection with Varedo which in turn leads to the Mattarazzo concern in Brazil. The somewhat loose connection through the Japanese companies right back to Du Pont and Glanzstoff is also shown.

Diagram No. 4—French Comptoir

The long list of connections of the French Comptoir is shown so far as this is possible. Through the Rhodiaseta Co., there is a connection with Du Pont and thus follows the somewhat vague connection with Snia via Teikoku and the closer bond through Koln-Rottweil with the German industry. The connection with the Belgian industry through the Textiles Belges is a new one. Two further lines of connection with Glanzstoff are shown, one through the Cupro-Textile and the other through the Celta hollow filament companies. The Spanish industry is represented by the S. A. Fibras Artificiales.

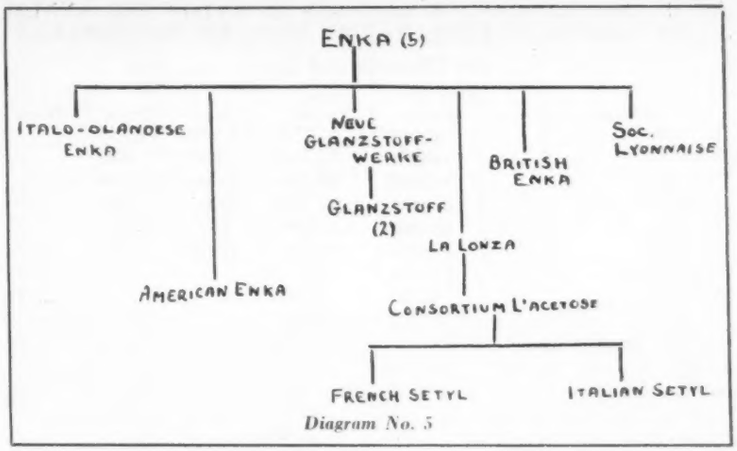


Diagram No. 5

Diagram No. 5—Enka

The Dutch Enka Co.'s connections are plainly apparent and perhaps the most important of these is that through the Neue Glanzstoff-werke with the Glanzstoff Co. There are reports of connection with the Breda Co. which would give further extensions to the French, Spanish and British industries but these are as yet unconfirmed and have not been included.

Expanding Use of Acetate Process and Its Effect On the Viscose Situation

Europe Now Producing Acetate at Rate of Over 18,000,000 per Year—Outlook for Future

Special to TEXTILE WORLD

The entrance of several American companies into the acetate field has focused attention upon this particular process. The following article outlines the situation abroad. It is accompanied by a table showing estimated production, by processes, in the various European countries.

ONE of the outstanding features of the rayon trade in the last two or three years has been the growing competition between the acetate and the viscose yarns. The growth in the production of acetate has been very rapid and whereas a few months ago, it might be said that this was to a very large extent a monopoly of the Celanese group, the latest information shows that this can scarcely now be claimed. Nevertheless, as has been mentioned recently, the production of competitive companies is rather a matter of the future than of the present.

In TEXTILE WORLD last June were published figures showing the total production of acetate rayon in Europe to be at the rate of 14,600,000 lbs. per year but a glance at a revised table which is published in the current issue shows that this total now stands at 18,080,000 lbs., a very substantial increase in such a short period.

In the June estimate, Britain was shown as producing 10,000,000 lbs. of acetate rayon per annum and this is increased in the later table to 11,500,000 lbs. The Celanese plant has been greatly extended and production has also been extended by Courtaulds and by the British Acetate Silk Corp., while other companies are preparing to produce. In Italy, the June estimate of 400,000 lbs. per year has been increased to 800,000 lbs.; in France from 2,100,000 lbs. to 3,000,000 lbs.; in Germany from 400,000 lbs. to 800,000 lbs.; in Belgium from 1,300,000 lbs. to 1,500,000 lbs. Small quantities are also produced in Holland and in Switzerland.

These figures, though comparatively large, will be considered small when the plans of the companies are completed and it is obvious therefore that the commercial community holds the opinion that acetate rayon will increase in demand at a faster rate than viscose. It is not however to be supposed that even in Europe there are not many people in the trade who hold views diametrically opposed to this. In the opinions of these people viscose will permanently triumph over acetate.

Obstacles Overcome

Formerly the chief argument used against acetate rayon was the difficulty connected with dyeing but invention during the last two years has removed this obstacle and moreover the valuable cross-dyeing properties have done more than anything else to increase the demand for the fiber.

Price has been another great obstacle in the development of the consumption of acetate silk on a large scale and it will be noted that today the consumption is only of material importance in those countries where the standard of living is high. The acetate producers were however preserving a big margin between production and selling costs and they have now been enabled to bring down the latter very materially.

In Britain, the approximate price for 150 "A" quality acetate yarns is 7/9 per lb., with a possibility of further reduction while the market is weak. Multi-filament viscose with 75 filaments and 150 denier sells at about 7/3d. while ordinary "A" quality 150 denier viscose is at 6/–. It will be seen that the acetate and multi-filament viscose yarns are now approaching each other in cost and there is little doubt that where there is competition, they are found to be equal. As a matter of fact, in many sections of the hosiery trade the viscose has recently been accepted in preference to the acetate.

In the weaving trade, acetate has been found to be superior in many respects to viscose, more especially in the production of plain cloths. This is an important asset which the producers of acetate silk naturally make the most of. It is claimed that acetate silk enables the cotton manufacturer to offer to the public a more perfect article and if the price of acetate is to be the same as viscose, it is to be anticipated that an increased amount of it will be used, though even here the assertion is hotly contested.

When it comes to the public judgment, acetate silk has an exceptionally

ESTIMATED RATE OF PRODUCTION OF RAYON PER ANNUM IN VARIOUS EUROPEAN COUNTRIES, BY PROCESSES

(In Thousands of Lbs.)

Country	Total Production	Viscose	Acetate	Cupra	Nitro
Britain	51,000	37,750	11,500	1,750	.....
Italy	44,000	42,550	800	650	.....
Germany	40,000	26,200	800	13,000	.....
France	27,000	23,380	3,000	500	120
Holland	18,000	17,600	400	.....	.....
Belgium	16,000	9,330	1,500	330	4,840
Switzerland	12,000	11,920	80	.....	.....
Poland	6,500	4,500	.....	.....	2,000
Austria	4,300	4,300	.....	.....	.....
Czecho-Slovakia	3,000	3,000	.....	.....	.....
Spain	2,500	2,500	.....	.....	.....
Hungary	1,000	300	.....	.....	700
Greece	500	500	.....	.....	.....
Russia	500	500	.....	.....	.....
Sweden	400	400	.....	.....	.....
	226,700	184,730	18,080	27,230	7,660

strong appeal and it has been backed by a display of advertising which has never been made by the viscose producers.

Outlook for Future

Under the present circumstances and in the present state of our knowledge, it is probably useless to endeavor to forecast which way matters will go and whether acetate rayon will disappear and viscose triumph or vice versa. The general opinion of all experts is that both will continue to fill their respective spheres and in the eyes of many there is the view that acetate has not yet been developed sufficiently and that demand is further away from saturation point than is the case with viscose.

The costs of production and the relative selling prices will exert an immense influence over the future of this question. To take one example, there is reason to believe that nitro-cellulose rayon, if prices were more favorable, would be very much more popular in certain countries than it actually is. It was the original process by which rayon was produced but today, so far as several countries are concerned, it is virtually unknown, simply because the costs of production are said to be too high.

It is probable that when acetate rayon is produced on a really large commercial scale, the actual costs of production are lower than those for the best types of viscose. Everything depends upon the recovery plant and it is in this department rather than in the actual silk production where the costs are saved. In viscose rayon production the by- or subsidiary products are certainly important but they do not constitute the important element which they occupy in the acetate field. It is possible that the time might come when an acetate producing plant might have to close down a part or the whole of the rayon producing plant, yet by selling raw acetate for films, unsplinterable glass and many other purposes, quite a reasonable profit could be made and one which would probably exceed that obtainable under similar circumstances by viscose producers.

Uses of Acetate

One of the main uses of acetate silk is in warp sateens, and in certain other fabrics where a particular luster is required, acetate is freely used. On the other hand, as previously mentioned, the hosiery trade does not take kindly to it at present. It has been said that the proportion of acetate to viscose will not materially increase above the present level but this is strongly contested and while it is perhaps unlikely that acetate will ever oust viscose, at the same time there is certainly room for an increase in the proportion used. If the world consumption of acetate increased in the next few years to only 10% that of all classes, the increased production required would be very large and many people hold the opinion that the proportion will be much higher than this.

It is known that the spinning of acetate silk is not an insuperable technical operation but the crux of the matter lies in the production of a good cellulose acetate at a low price. In other words the question of success within the acetate rayon industry depends to a very large extent on the cost of producing the acetic anhydride and it is here that one or two companies are making the greatest headway. Attempts have been made to do away with the acetic anhydride altogether but these have not proved really successful and interest is centering on the low cost anhydride.

The only clear indication so far as the future is concerned is that the selling prices of good grade acetates and good grade viscoses in the future are not likely to ever again show the large margin of difference which they have done in the past.

As explained above, some sections of the weaving trade are anxious to have acetate at anything like a reasonable cost. Part at least of the present depression in acetate is due to the fact that the weaving trade has not been making such large quantities of the particular cotton and rayon mixtures in which acetate figures so prominently.

The Patent Situation

The production of acetate rayon has been restricted by the fact that up to recently production was largely in the hands of the Celanese group and as will be seen from the undermentioned the amount of acetate rayon produced under the Dreyfus-Clavel patents is still a very large proportion of the whole.

The Dreyfus-Clavel patents are operated by the British Celanese Co. in Britain, the Celanese Corp. of America in the United States, the Canadian Celanese Ltd. in Canada, the Tubize Co. in Belgium, the French Tubize Co. in France and will, it is reported, be shortly worked by a new offshoot of the Tubize Co. in Italy.

In this connection it is interesting to note the details of the original 1922 agreement between the Dreyfus-Clavel group and the Tubize Co. So far as Belgium, Poland, Hungary, and Czecho-Slovakia are concerned, the exploitation of the processes was to run for 15 years after which it was to be open to either party to do as it chose. During the 15 years, Tubize was to pay to the Dreyfus-Clavel group 20% of its profits. In Germany the right to exploit was to run for 20 years and during this period 25% of the profits was to be paid to the Dreyfus group while British Celanese was to be allowed to sell up to 20% of the Tubize sales. In both countries a small minimum payment was guaranteed to the Dreyfus group. In France and Italy, sales are reserved in full for Tubize but the Dreyfus group was to have foundation shares in the French subsidiary company which was to work the French and Italian territories. These shares were to carry the right to 25% of the profits after a dividend of 7% had been paid on the capital and a maximum bonus of 12% had been paid to the board. The British Celanese Co. also had the right to sell in Italy 20% of the Tubize sales for a period of 15 years.

A process invented by Dr. Zdanowich of London and worked experimentally by the Consortium de l'Acetose in Switzerland is being acquired by the Lonza Power Co., who will work it in Switzerland in conjunction with the Dutch Enka Co. Presumably the Dutch Enka will use these patents in Holland. On the other hand, the patents will be worked in France by the Setyl Francaise and in Italy by the Setyl Italiana.

Another patent is that of the Syntheta A. G. which, while only passing from the experimental stage, has some promise. The French rights have been secured by the International Artificial Silk Co., and the British and American rights by the Alliance Artificial Silk Co.

The Ruth-Alder patents are being worked in Italy by the Soie de Chatillon and will be used in the United States by the American Chatillon Co. The Dreaper patents are to be used by the Cellulose Acetate Silk Co. in Britain and, among others, it is understood that Du Pont is interested. Independent patents are used by Courtaulds Ltd. and The Viscose Co. There are also the important Rhodiaseta patents which are worked by the Rhodiaseta branch of the French Comptoir in France, and will be put into operation by the German Rhodiaseta Co. in Germany, while the American rights are in the hands of the Du Pont Rayon Co. Among others may be mentioned the new patents now obtained by the British Acetate Silk Corp., the potentialities of which are confirmed by the fact that they are being worked in part by the I. G. Farbenindustrie in Germany.

Whether or not these patents will be seriously challenged by the Celanese interests is as yet unknown. There has been considerable opposition but no legal action has been taken, it being asserted that the production is not yet sufficient to justify such a course being adopted.

In conclusion, the coming introduction of the Lilienfeld yarns will add interest to the viscose production and furthermore it is possible that staple fiber may grow in importance in the next few years. These products however do not directly affect the issue so far as can be seen at present and there is little evidence to prove that the general contention, that each will continue to serve its specific purpose, will prove wrong.

Rayon Fabrics Manufactured on Tricot and Milanese Fine-Gauge Machines

Glove Silk Equipment Among the Last to Take Up Artificial Fibers—Types of Product

By R. Presgrave

WHILE knitting was the first main branch of the textile industry to seriously employ rayon, warp-knitting on the fine gauge Tricot and Milanese machines was among the very last to succumb. Probably the coarse latch needle warp machines were among the very first to use rayon with commercial success when such machines as the Raschel and Swiss Muffler brought their "art silk" products before a widening public. Simultaneously there came circular knit goods from ties to underwear. Obviously rayon was commencing to stand upon its own feet and it seemed only a matter of time before it would invade every branch. It was being successfully adapted to various types of weaving before the glove silk machines finally got into the swing.

There were several reasons for this delay. In the first place it had been the custom to use only very fine pure silk yarns to knit lightweight glove fabrics, so that the most natural step was to try the fine rayon yarns with the idea, more or less, of duplicating the original fabrics to make cheaper gloves and underwear. In the first place rayon was not as physically excellent as it now is. Fine counts were difficult to obtain and next to impossible to handle on the machines. Thus the early experiments were disappointing and led to delay. Some Milanese cloths were made from the deniers around 50, out of both cellulose acetate and the rayons. Most of these were imported in the form of underwear, while some were used, with most indifferent success, for gloves. The cloth was satisfactory enough for underwear but was too heavy for gloves and did not wear as well as the lighter and more resilient pure silk fabrics. Even at the present time the writer is not aware of any firm using rayon for gloves. The development has been in other directions.

Early Problems of Friction and Tension

The somewhat discouraging effect of the experiment with gloves led to the further belief that the machines were too fine to take any rayon yarns with real success. But this was not really so. The truth was that the glove silk fabrics could not be easily duplicated, but that other kinds of cloth could be made on 28-gauge machines using counts as heavy as 150 deniers. The true difficulty was to arrive at the technique of handling the rayon in winding, warping and knitting. Pure silk requires different treatment from rayon and, in a measure, will stand more abuse. Consequently when an attempt was made to transfer from silk to rayon much trouble was encountered, mainly in the two items of

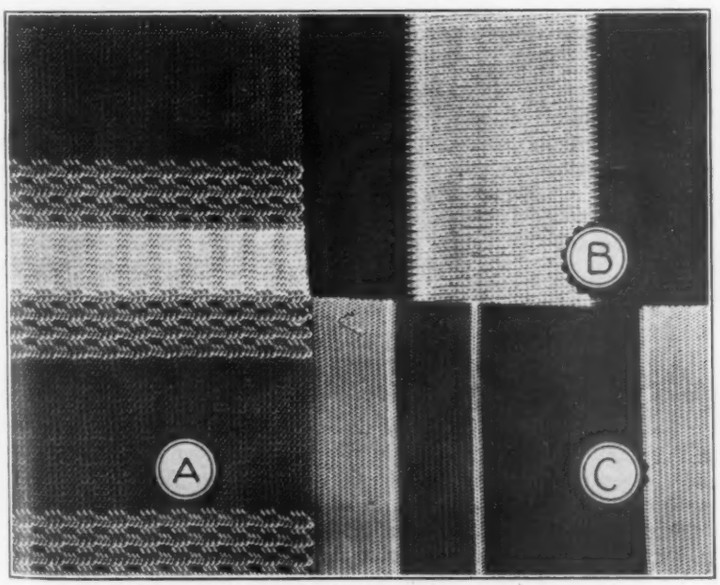


Fig. 1. (A) One-Bar Tricot, Broken Stripe; (B) Two-Bar Satin Stripe; (C) One-Bar Tricot, Plain Stripe

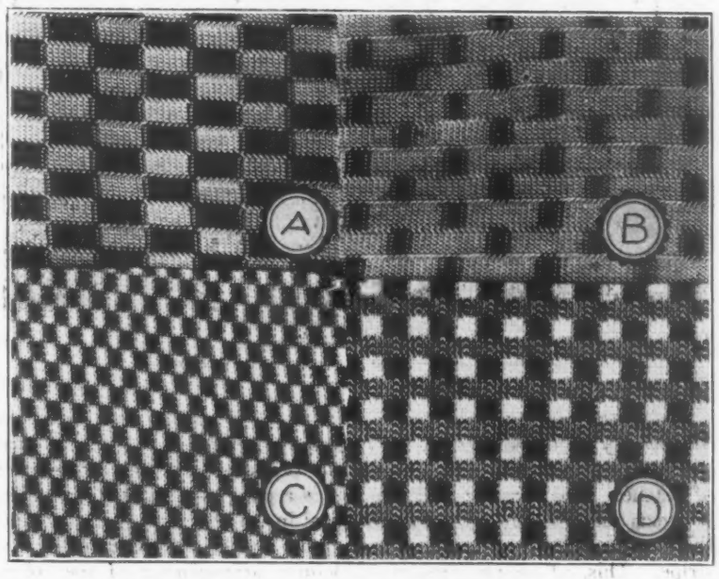


Fig. 2. (A) One-Bar Tricot Checker, Alternating 8 and 8 Ends; (B) Same as A, Alternating 4 and 16 Ends (A and B Knitted Simultaneously); (C) Two-Bar Checker; (D) Two-Bar Checker (C and D Knitted Simultaneously)

friction and tension. Silk being trenchant and abrasive in its action, had roughened and nicked all the points of yarn contact on the machines, and when it was attempted to run rayon the results were fuzzy yarns and an incredible percentage of breakages throughout. It requires little imagination to visualize the effect of trying to run a soft 150 denier yarn through a 21 denier nick.

The first move then was to replace procelain guides in winding, provide new and smooth warping brasses, and put new insides in the knitting machines. Coupling with these strict attention to oiling methods, tension, dyeing and so on, and close supervision of the individual workers, it was not long before encouraging results began to appear, especially on Tricot machines. The recent development on the Milanese has been virtually negligible. This is due mainly to the fact that the usual 28-gauge Milanese frames do not take deniers above about 50 with any degree of reliability. The fabrics they do produce are very good, but not sufficiently superior to high grade circular spring needle fabrics to warrant the more expensive method of manufacture.

While Tricots are made to produce fancy cloths in some variety, Milanese is confined almost entirely to plain goods. In fact the only fancy Milanese goods the writer has seen recently came from alternating a bobbin of pure silk (13/15 4-thread boiled-off tram) with a bobbin of cellulose acetate (50 denier). The resulting cloth was then cross-dyed, leaving the acetate white and giving an excellent diamond plaid effect. Unfortunately the cloth was troublesome to make and hardly worth the expense. No doubt if this type of work were concentrated upon, good results might be expected, but at present the demand is well filled by other fabrics.

Tricot Frame Products

One of the main uses to which the Tricot frame has been put is the construction of goods for cravats and mufflers. These are in the main confined to one- and two-bar fabrics; the one-bar taking 120 to 150 denier rayon, and the two-bar 90 or 100 denier. The yarn, of course, is dyed in the skein and the effects are produced by careful grouping of color combinations in coordination with the relatively simple motions imparted by the stud wheel to the guides.

There is no limit to the variety of plain striped goods that can be

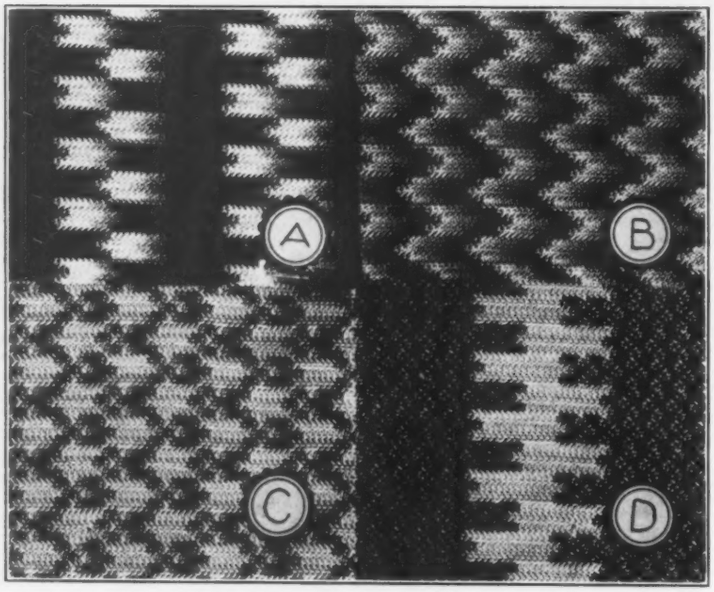


Fig. 3. One-Bar Tricot, Combination of Shift and Broken Zig-Zag; All Four Patterns Knitted at the Same Time in One Machine

made on the one-bar Tricot, and there are also stitches that break up the severity of the stripes. A very common variation of pattern is that produced by shifting the bar alternately back and forth at a set number of stitches. The simplest result of this is a plain isolated checker design in which the sidewise shift is about equal in length to the space between shifts, thus breaking up into squares what would otherwise be a plain stripe. This, of course, requires a definite arrangement of the colors in warping, or the result is a mere jumble. Various related but more elaborate results may be similarly obtained. Some of these are illustrated.

One of the most advantageous features of all these cloths is that any width may be made from a few inches up to about 15 feet (180 inch machine). Thus, as the necktie cloths are usually 24 inches wide, at least seven patterns may be made side by side simultaneously. The fabrics are knitted fairly tightly. In the plain stitch one-bar numbers, the rack length is about 5 inches (90 to 100 stitches per inch), while the fancier types having shifts and zig-zag effects usually run about 7 inches. All these make durable cloths of a somewhat harsh nature well adapted for neckties on account of the freshness of color and pattern and the fact that they do not slip at the knot. The ties themselves are made up in much the same manner as cut silks, having the usual seams and interlining. They have a considerable advantage in not twisting as woven goods often do; moreover they can be very easily ironed to remove creases. In the matter of holding their shape the ties have superior qualities.

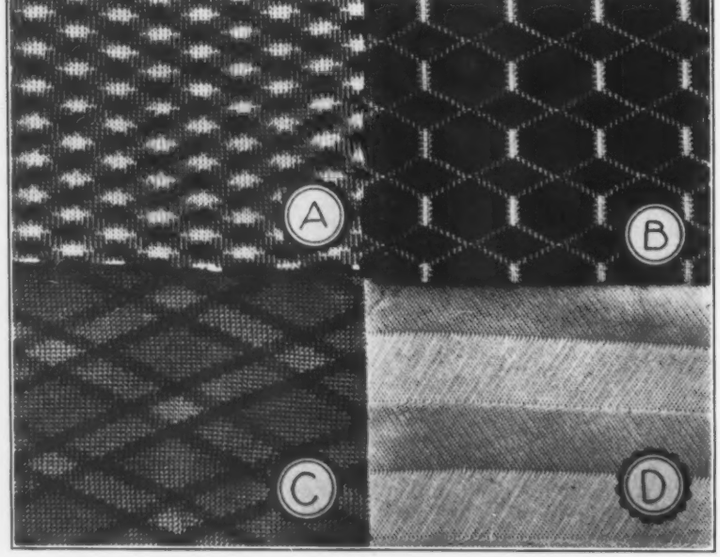


Fig. 4. (A and C) Two-Bar Atlas, Knitted Simultaneously; (B) Combination of Plain Stitch and Atlas; (D) One-Bar Atlas for Lingerie

Two-Bar Cloths

In the main, the two-bar cloths are in their turn superior to the one-bar as far as creasing and holding the shape are concerned. Almost all of them wear very well and some of them last almost indefinitely while still retaining a fresh appearance. The use of the two bars working together necessitates looser knitting to accommodate the added yarn, so the rack length of most of these goods is usually 10 inches or more; but it varies considerably with the type of stitch. One of the most frequently encountered is the familiar Atlas stitch, originally used for cotton gloves but eminently satisfactory for knitting rayon. This cloth is made by the bars knitting diagonally, and in opposite directions, over several needles and then returning in the same manner. Usually 12, 24 or 48 needles are traversed and the result is an angular pattern giving plain diamonds or plaids, or combinations of both, according to the distribution of the yarn in the warps. Sometimes only one bar is used and plain zig-zag designs are obtained.

The two-bar Atlas when made from 100 denier rayon runs about 14 inches to the rack. The one-bar would be from 150 denier yarn and run 10 inches to the rack. Combinations of Atlas and plain stitch are very effective when alternated in the same cloth. A simple one of these is illustrated. A recent application of Atlas is a one-bar fabric of 100 denier yarn or less, knitted fairly loosely and dyed in the piece when it is used as a run-proof lingerie fabric. The traverse, which may be anywhere from 6 to 48 needles, gives the effect of a herringbone stripe. It is a very soft fabric to the touch, especially when made from acetate rayon, and has proven most satisfactory in many ways. From a manufacturing standpoint it has an undesirable feature in the cutting-up. On account of the stripes being transverse the garments must be cut with the width of the goods, instead of with the length as is the custom with most underwear cloths. This gives shorter cutting lengths and also necessitates reversal of procedure in the tentering in order to produce the stretch in the length instead of in the width.

Any of the cloths may be finished on the automatic clip tenter after being cut into the component widths, or they may be finished on the hand tenter in one whole piece, cutting the separate strips by shears after the tentering. The hand method gives closer control of weight and finish and is very satisfactory without being over-expensive. It has as well the advantage of permitting one to carefully vary the dimensions of the patterns, so that with its aid one may reduce oblong checkers to exact squares, or narrow diamonds to wide, and so on, thus overcoming the effect, to some degree at least, of too tight or too loose knitting. Most of the fabrics, prior to tentering, are treated a little with gum arabic, gelatine, etc. This prevents curling at the edges and helps the feel and appearance of a necktie cloth, as well as making cutting easier. If the cloth is to be used for scarfs or lingerie the dressing is almost nil, as softness is here most desirable.

Another excellent two-bar cloth is the small checker design, two of the plainer numbers of which are illustrated. This is also produced by bar shifts and gives several variations of the checker according to the distribution of the yarn. For instance, of the two patterns shown the small pin check is made by alternating two black with two white threads on each bar, while the larger one, knitted simultaneously, is from an alternation of four black and four white. Very pleasing effects can be obtained by other groupings and by inserting other colors. The cloth, knitted about 9½ inches to the rack, is very durable and closely resembles a woven fabric in appearance.

Satin Effect Cloths

A satin effect, made by knitting one bar plain and throwing the other back and forth over three needles at each stitch, has proven satisfactory for ties and scarfs, but it has not the durability of other two-bar goods as the shiny face is more readily roughened. When properly knitted and finished the cloth has so much the appearance of heavy satin that it is difficult to detect that it is a knitted fabric from any distance. In order to permit the near floating of yarn on the face, the top warp is nearly twice the length of the bottom warp. The rack length is usually under 10 inches, as the knitting must be quite tight in order to lay the yarns as close together as possible, with the idea of enhancing the glossy appearance. It may be noted that in this cloth, what is usually the back of the goods is used as the face. The reverse is a plain stitch. The

patterns are confined to self shades and stripes. The latter are most attractive, and in some cases very brilliant.

A modification of this cloth, knitted in the white and dyed in the piece, has, under the name of "Swami," gained a prominent place in the corset trade, where it is used for insets, brassieres and so on. Generally the face is of 100 denier rayon, while the back is of a good grade of cotton, either plain or mercerized, and varying in count from 40s to 80s. The proportion of cotton and the tightness of knitting determines between them the weight and value of the cloth. As before, the top bar carries about double the length of the bottom. The rack length varies from 10 to 14 inches, or thereabouts, and the looser grades have more of a ribbed and less of a satin appearance. The cloth wears and washes well, retains a fresh appearance, and has the advantage of a certain degree of elasticity.

Other satin cloths knitted from rayon entirely are used in women's dresses and sportswear. The knitting is generally fairly loose. Necktie and corset goods are somewhat too heavy and boardy to use for dresses.

This brief outline by no means covers all the varieties of fabrics made on the Tricot frames; it merely illustrates a few of the commoner types. New numbers are frequently produced and, while they can hardly compete with the coarser latch-needle warp-knitted goods in variety, they have a definite field of their own which they fill admirably, combining as they do the virtues of both woven and knitted goods. In the neckwear trade they deserve the wider use that has been denied them on account of their being cheapened considerably by being pushed as a novelty fabric and developed at the same time in crude color combinations to catch the less fastidious eye. It is to be hoped that they will develop conservatively and become more or less standard fabrics. In the vast maze of knitted fabrics this development may be slow, but the discovery of further uses and newer stitches will no doubt assist greatly.

Progress in Making Rayon Warps—Refinements in Preparatory Processes

New Machinery Gives Better Control of Tension and Drying—Things to Be Avoided in Beaming and Slashing

By Ray Winder

RAYON is by no means in its infancy, but we must admit that it is still a child, compared with the older textile materials. It is different than any fiber the weaver has used before. How to weave it successfully in many goods is a very interesting and pressing problem of the cotton industry on which many men are carefully working and making progress. Many new devices have been put on looms, such as double filling forks, warp stop motions, feelers, fur-lined shuttles, new temple rolls, improved let-off and take-up motions, special bobbins and cops, etc. But with all these improvements the warps will not weave successfully if they are not properly made.

Rayon is no exception to the general rule that applies to other textile fibers. The soft loosely twisted thread is not suitable for warp in its original state and must undergo a special strengthening or reinforcing process. It must be sized in order to give it strength, smoothness, and elasticity to withstand the various operations to which it is subjected during the process of being converted into the woven cloth. Because of the importance of sizing in relation to weaving, the rayon converters have taken great interest in this operation.

Improved Equipment

The sizing of rayon for weaving purposes can be broadly divided into three methods. These are single thread, skein, and complete warp sizing. The single-thread method is not largely used in this country. The skein-sizing method is being used with a fair degree of success on a small number of ends and on very light weaves. But where large numbers of ends in one warp are required, experience has shown that the warp-sizing method is best. The complete warp may be made on the cotton slasher and sized at the same time, or it may be made on a regular silk warper and then sized on a rayon sizing machine.

Cloth manufacturers and machine builders have made numerous experiments and produced machines by which the rayon yarn may be sized in its passage from the warper beam (made on the silk warper) to the weaver's beam or loom beam. The writer will try to give a brief outline of some of the principal features that he has come in contact with on one of these machines. He has been using the Van Vlaanderen rayon warp-sizing machine and can compare it with the ordinary cotton slasher.

Before explaining some of the features of this machine, I would like to place before the readers the fact that the most difficult problem confronting the converters of rayon is how to eliminate the stretch or elongation of the fiber, both in the dry and the wet state.

Tension Control

In designing the "Van V" machine, the builders have given the tension problem a great deal of thought. They have overcome a great deal of trouble by shortening the space between the warper beam and the nip of the quetch roll, as compared to the cotton slasher. The possibility of stretching the rayon is also reduced by the improved method of applying friction to the warper beam and by having rolls run on ball bearings.

Whether the rayon warp is sized on a cotton slasher or on a rayon sizing machine, most of the stretch takes place after the size has been applied and before the yarn reaches the first drying cylinder. In order to overcome the trouble at this point the builders of the machine under discussion have a positive stretch regulation device. This is made up

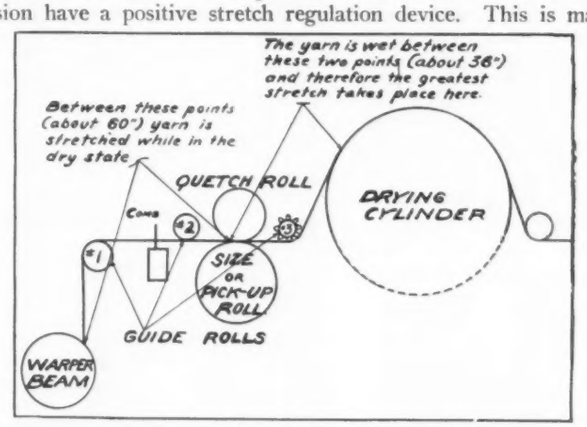

The yarn is wet between these two points (about 36") and therefore the greatest stretch takes place here.
Between these points (about 60") yarn is stretched while in the dry state.
QUETCH ROLL
DRYING CYLINDER
Comb
#2
#1
SIZE OR PICK-UP ROLL
GUIDE ROLLS
WARPER BEAM

Fig. 1. Ordinary Cotton Slasher

of two cone-shaped pulleys. One of these pulleys is driven from the cylinder next to the size box, and with a one and one-half inch belt drives the other pulley on the end of the size roll shaft. The tapers of these two pulleys are in opposite direction. By shifting the belt the size roll can be regulated to run at the same or a different speed than the cylinder.

Geared to the front cylinder through a small chain is a yardage counter that registers the yards in the warp after it is sized. If the yardage from the warper is correct, the gain in sized yardage over the warped yardage indicates the percentage of stretch or elongation.

On the ordinary cotton slasher the beam or beams, if more than one is used to give the required number of ends, (which in the writer's opinion should not exceed 3,000 ends) are placed in the creel. The yarn runs from the beam over guide roll 1, through a comb and over guide roll 2, then passes between the size and quetch rolls and under guide roll 3, to the drying cylinder as shown in Fig. 1. Window cord, or in some cases a narrow belt, is used to apply friction to the warper beam, with some sort of an iron weight attached. This method does not give the small variations in friction that it is possible to get with lever friction.

On the "Van V" machine the warper beam is placed in two bearings on a suitable stand. This stand has a hand wheel at the lower left which permits easy adjustment for different width beams. At the right is another hand wheel. By turning this wheel to the left or right the whole carriage is moved to left or right. This device is called the let-off. At the front of the machine is another adjustable carriage with a locking device. This is called the take-up. A measuring scale on the let-off end

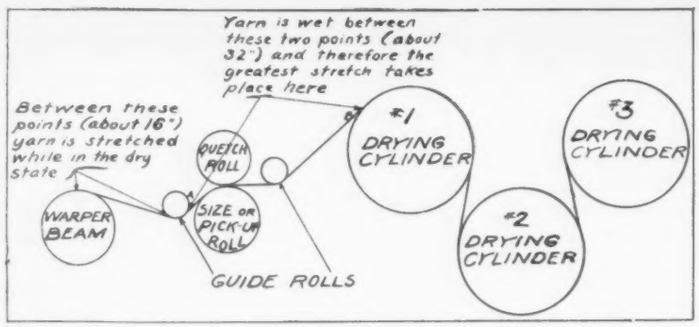

Yarn is wet between these two points (about 32") and therefore the greatest stretch takes place here
Between these points (about 16") yarn is stretched while in the dry state
QUETCH ROLL
#1 DRYING CYLINDER
#3 DRYING CYLINDER
WARPER BEAM
SIZE OR PICK-UP ROLL
#2 DRYING CYLINDER
GUIDE ROLLS

Fig. 2. Rayon Sizing Machine

corresponds with another scale on the take-up end to center the warp before starting the operation of sizing. Any further centering can be accomplished while the machine is in operation.

The warp runs from the warper beam under a guide roll, then between the size roll and quetch roll and under another guide roll to the surface of the first heated cylinder where it is partly dried. From this first cylinder the warp passes to the second cylinder and then to the third cylinder, as shown in Fig. 2. Brake lining belts around the beam flanges give the warp the proper tension, which can be regulated by weights. There are three studs for holding the tension belt to correspond with the different sizes of tension flanges. This tension arrangement is shown at Fig. 3.

The size box is made of tinned copper and is not as wide nor as deep as the size box on the cotton slasher. It holds from 6 to 8 gals. of size liquid, depending on the width of the machine. The size box is made half round to conform to the shape of the size roller, to reduce the amount of size liquid needed, and to enable better cleaning.

This size box may be called a double-jacketed size box. It has a steamheated water jacket to keep the size at an even temperature, which is indicated by a thermometer. The size liquid is poured into the size box through a funnel and pipe arrangement. Attached to the bottom of the size compartment is a water jacket, and through this water jacket runs a steam coil. It can readily be seen that this arrangement reduces the chance of overheating, since steam going into the size will run the temperature far above the boiling point and also dilute the mixture. For cleaning the size box there is a device by which it can be lowered. There is also a pipe connection for emptying.

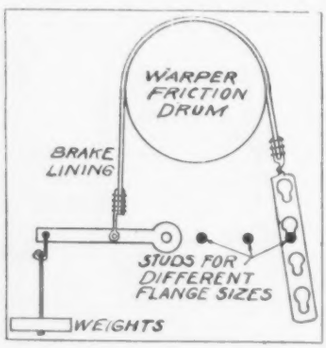


Fig. 3. Tension Arrangement for Warper Beam

Care of Size Roll Blanket

The size roll or pick-up roll is made of brass. To get a more even and thorough application of size on the yarn, this roll should be wrapped with two or three yards of a good cheese cloth. This cloth will be found to be a great help in carrying the size up to the nip of the quetch roll. It is a good plan to take this cloth off and wash it out at least once a week. The surplus size liquor is squeezed out by a rubber-covered quetch roll. This roll has a handle on each end which enables the operator to raise the roll high enough to allow the knots, aprons, etc., to pass through. There is also a lever on each side of the roll with adjustable weights attached for adding more pressure to the quetch roll if desired or necessary.

Another vital improvement is the provision of three small drying cylinders in place of the one large cylinder on the ordinary cotton slasher. These cylinders are made of tinned copper, but some machines are put out with nickel-plated cylinders to give a smoother surface.

These cylinders are mounted on roller bearings and are positively gear driven. These features eliminate the pull on the wet yarn, thereby reducing the stretch to next to nothing at this point. On most cotton slashers the cylinders are automatically held at predetermined temperatures, usually about 8 to 10 lbs. pressure. The rayon warp therefore comes in contact with the hot cylinder at 10 lbs. pressure as it leaves a lukewarm size solution. In the writer's opinion this sudden change of temperature does not give the rayon fiber a fair chance, the high temperature having a tendency to bake the size rather than to dry out evenly.

Drying the Warps

On the "Van V" machine each individual cylinder is controlled by a separate valve whose pressure registers on a separate dial. As a result, No. 1 cylinder may be heated to a lower temperature than No. 2, which does the bulk of the drying. The third cylinder can be regulated to take as low a pressure as may be required to complete the drying. This variation in temperature is very essential and important for successful warp sizing. Safety valves protect against overheating and excess pressure. Each cylinder is equipped with two safety valves. Provision is made to take care of the condensation. The three cylinders have another particular advantage in that the warp as it passes over and under them is dried from both sides.

As the yarn is delivered by the third cylinder it is wound on the loom beam by the take-up. The beam can be centered and adjusted during operation by a screw operated by a hand wheel at the right. The take-up motion drive runs faster than the cylinder, the extra speed being retarded by a slip belt that can be adjusted to give the dry warp the necessary tension to wind it firmly on the loom beam.

The machine is equipped with an Eastwood drive which permits a gradual stop or start. It is also equipped with a Johnson single-friction clutch on the main driving pulley, and a Reeves variable speed motion. Vertical shifter handles at both ends of the machine, connected to the horizontal shifter rod on the side, give easy control in starting and stopping. The clutch and variable speed device assure smooth, economical, noiseless, and highly satisfactory driving service. The machine can be picked up to the desired speed easily without noise, jar, or shock.

Because rayon warps vary in construction as well as in material and workmanship it is not always advisable to run a machine at the same speed. The Reeves transmission allows the operator to obtain a variation in speed of from 5 to 20 yds. per minute.

Things to Be Avoided

To insure quality and production in warp preparation the material delivered to a sizing machine should be as near perfect as it is possible to make it. So in summing up this article the writer would like to mention a few "don'ts" bearing on the warping and beaming operations.

Don't start the warp on the reel until all bobbins and ends are in the proper places and the right yarn is being used.

Don't let the operative stop the warper at night or at a week-end on an unfinished section; try to have the warp finished.

Don't have any loose or lost ends in the warp. Loose ends are frequently the cause of a great deal of trouble on the sizing machine and make a lot of extra trouble for the weaver.

Don't build the sections too narrow or too wide.

Don't forget to have the proper number of leases and be sure to have them in their proper places.

Don't have the wrong yardage in different sections or in the whole warp.

Don't have the selvages or edges in with the warp if the weave shows that they will not run that way.

Don't leave imperfections such as split ends, slubs, etc., to be taken out later; take them out while warping.

Don't forget to have an apron on the beam before beaming. This apron should be about 20 ft. long so that it will reach through the sizing machine.

Don't have too much tension on the warp when beaming.

Don't be too economical with the paper when beaming.

Don't use paper that is too narrow; have a fair margin on each side.

Don't add more tension after the warp has been started.

Don't forget that warping and beaming are very important operations in processing rayon.

Health in Rayon Plants

The question of health in rayon factories has been under discussion at the recent Trades Union Congress in England and effort was made to have a Government committee set up to investigate the position. Actually the matter is being made too much of, as it is only in certain unsuitable buildings which have been taken over by new producers that conditions are at all bad. Courtaulds' works are excellent in this respect and moreover all employes from top to bottom are granted pensions, the weekly wage earners not having to make any contribution. It is felt that some of the more poorly equipped mills will gradually lose their best workers.

Rayon and Rayon-Cotton Combinations in Narrow Woven Fabrics and Braids

Value of Mercerized Cotton Yarns—Kinks on Warp Preparation, Weaving, Braiding, and Finishing

By M. E. Jameson

As the annual consumption of rayon increases from year to year so, also, does the number of different uses to which this wonder-material is put. It is now used for almost every purpose for which a textile fiber may be utilized, alone or in conjunction with other materials. With the gigantic strides which it has made it has, of course, invaded various fields, until now there is hardly a branch of the textile industry upon which it has not exerted some influence.

Among the companionate materials that are used with rayon are cotton (both mercerized and unmercerized), wool, worsted, linen, tinsel, and mulberry, or real silk. Perhaps the combination most often used—and this combination is not confined to the narrow woven field alone—is rayon and mercerized cotton. In this fortunate combination the brilliant luster of the rayon does not show up the companionate material to the great disadvantage that obtains in other combinations, but each blends with, and serves to increase the sheen of the other as if they knew of the close relationship that exists between them. Their intimacy in the manufactured article, however, dates back only to the point of weaving; previous to this time they are treated separately.

In narrow fabrics rayon can be used advantageously in combination with mercerized yarns in a number of different ways—rayon warp and mercerized filling; mercerized warp and rayon filling; mercerized warp and filling with extra warp or extra filling of rayon, or both extra warp and extra filling of rayon.

Spooling in Narrow Fabric Mills

No special advice is necessary concerning the spooling of mercerized cotton. The same methods of procedure are followed as with unmercerized cotton yarn, the only noticeable difference, perhaps, being in the additional facility with which the treated yarn is spooled, or tubed.

For narrow fabric work rayon is usually put on spools or bobbins. Not only does the slippery nature of the material prohibit the use of parallel tubes, but this form affords very little or no protection to the yarn.

The skeins should not be snapped out vigorously before being placed on the spooling swifts, but should be handled as carefully as if they were glass. The guides should be of porcelain or glass, thus eliminating all possible friction, and all sharp bends should be avoided.

Rayon that is to be used for warp is often treated, or lubricated, at the spoolers. At this point there is very little expense attached to the process. All kinds of elaborate systems are in use, but a simple rod placed in such a position that the rayon, as it runs from the skein to the spool or bobbin, will pass over it will suffice. Along the length of this rod, which may be of wood, are attached pads of felt. These pads are saturated with the lubricant. Sometimes the lubricant is fed to the pads by capillary attraction from a long box that runs the length of the machine just below the rod that supports the pads. As far as the choice of a lubricant is concerned, every firm seems to have a preference. But among the lubricants commonly used are cocoanut oil, neatsfoot oil, a mixture of olive oil and kerosene, solutions of castor oil or glycerine, compounded mineral oils, etc. Sometimes, instead of using a lubricant, the yarn, especially if it is to be used for warp, is sized. Often this is done during the process of dyeing. A small amount of rice starch or potato starch is added to the rinsing bath along with a softener. The starch serves to bind the filaments together, which is practically the same purpose for which the lubricant is employed.

Warping on Separate Beams

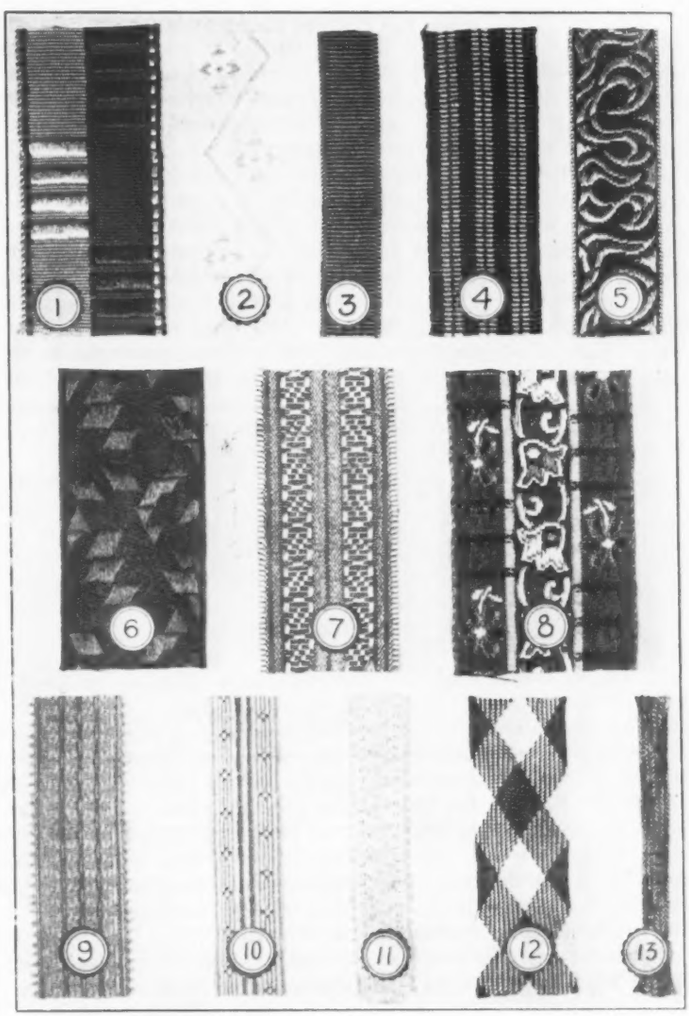
As with spooling, no special instructions are needed regarding the warping of mercerized yarns. Any machinery that is suitable for handling unmercerized cotton will answer. In fact, if any difference at all is noticed, it will be in favor of the treated yarn.

Rayon and yarns of other materials should be warped on separate loom beams. There are reasons for this aside from the possibility of difference in take-up. Two of the principal reasons are: first, because the slippery nature of the rayon would cause it to slip around the other yarn or cut down into the warp; and second, because the rayon requires special attachments at the warper, such as let-off motions, tension apparatus, etc., that are not necessary with most of the other materials.

Often, too, the comparative counts of the yarns are quite dissimilar. This alone would cause serious trouble because the coarser yarn would build up on the warp quicker than the finer yarn and result in uneven length of the different materials.

Even in chain warping, which incidentally is the manner in which

RAYON NARROW FABRICS AND BRAIDS



(1) Rayon Warp, Mercerized Cotton Filling; (2) Mercerized Cotton Warp, Rayon Filling; (3) Rayon Warp, Mercerized Cotton Filling; (4) Rayon Warp, Unmercerized Cotton Filling; (5) Rayon Warp, Rayon Filling; (6) Rayon Warp with One End Tinsel on Each Side Near Edge, Rayon Filling; (7) Rayon and Tinsel-Covered Cotton Warp, Rayon Filling; (8) Rayon Warp and Rayon Filling, Made on a Bank-Shuttle Loom Using Three Shuttles, Each with Different Colored Filling; (9) Elastic, Cotton Gut and Binder, Rayon Filling; (10) Elastic, Cotton Gut and Binder, Rayon Filling; (11) Figured Rayon Elastic Frill Braid; (12) Figured Flat Braid, All Rayon; (13) Flat Braid, All Rayon

rayon warps for narrow goods are usually made, the difficulty is not overcome. There are bound to be variations in the stretch of the different materials, and the different degrees of susceptibility to humidity has an important bearing on the subject.

As the warps are made they are leased by the operator. Where the warp calls for a large number of ends this operation is facilitated by the use of a special leasing reed. In a reed of this type every other end is blocked at both top and bottom for about an inch. (See Fig. 1.) In leasing, the total number of ends are grasped in one hand and lifted up beyond the level of the top of the reed. In this position one series of ends will be about an inch above the other series. The leasing string is passed through the opening thus formed and then the hand holding the ends is lowered until the relative position of the threads is reversed. The leasing string is then passed back through the second opening, thereby completing the operation.

Weaving Narrow Fabrics

In the manufacture of narrow fabrics it is not the practice to draw the warps in until after they are placed in the loom. Then girls that are engaged for the purpose perform this part of the work. Usually they become very adept and it is surprising how fast they can work. One girl at the back of the loom hands the ends in, first from one warp and then from another, according to the drawing-in draft. Another girl at the front of the loom catches the ends with a reed-hook, draws them through the heddles, or "healds" as they are termed in England, and then through the reeds.

Warp for Figured Designs

In drafting figured designs, whether the construction calls for extra warp or extra filling, the ground weave is usually drawn in on the front harnesses and the figure on those immediately following. The reason for this is that the ground harnesses are continually moving up and down, whereas some of the figure harnesses are raised and lowered less frequently and thus can be placed in a less advantageous position. If the webbing is figured with an extra warp of rayon and a large shed is required on these back harnesses, it will be necessary to provide a considerable length of warp yarn between the leasing rods and the warp beam. Sometimes this is accomplished by running the warps in an overhead rack, or, if the ceiling is not too high, running the warps to the ceiling and back to the leasing rods.

Rayon may be successfully woven with any other material or combination of materials. Of course there are some difficulties to be encountered in weaving rayon in any form. So are there difficulties and problems in weaving even plain cotton goods, difficulties that we have become so accustomed to that they are no longer considered. In the case of rayon, however, the problems, because new, seem especially near at hand. No doubt the better known textile materials had to pass through a similar stage in the early days of their development.

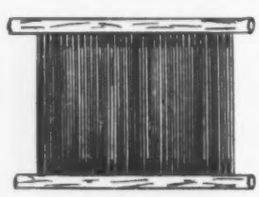


Fig. 1. Leasing Reed

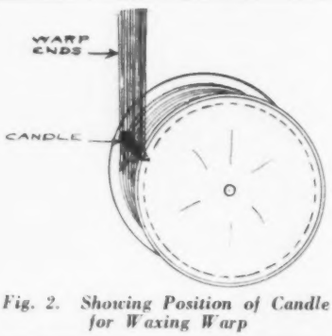


Fig. 2. Showing Position of Candle for Waxing Warp

In the weaving of combination fabrics much is yet to be learned, but each problem that confronts us and that is successfully solved brings us nearer our goal. A record of the solution of these problems would be of great benefit.

Filling Figured Goods

In weaving filling figured goods in which the warp is mercerized cotton, or other material that is liable to shrink, and rayon, and which is later to be piece-dyed, great care must be exercised to see that there is only enough tension placed on the filling to prevent the edges from segregating themselves from the body of the web. If the least undue tension is placed upon the filling, later when the goods are dyed, the filling will shrink with the result that the material will be puckered around the figure. And no amount of finishing will overcome this defect. The trouble is due to no fault of the materials, but simply to the natural tendency of the rayon to shrink considerably in the process of dyeing. The use of previously dyed or boiled-off rayon seems not to alleviate the trouble sufficiently to offset the expense of the extra process. The question might naturally be asked as to why piece dyeing is employed. Why not weave in the color? The answer is that piece-dyed goods are always much softer than goods woven in the color and often it is much less expensive to dye after weaving. Many skein-dyed colors have a "feel" resembling a board, when woven. Then, too, where piece-dyeing is practiced there are no left-over lots of odd-colored yarns.

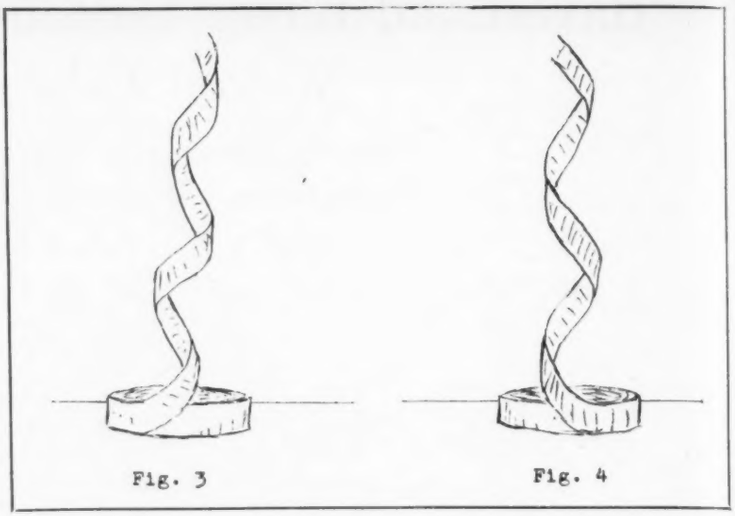


Fig. 3 Fig. 4

Tension on Warp

In weaving combination goods in which the rayon constitutes the extra warp, only enough tension, or drag, should be placed upon the rayon warp to prevent the ends from becoming so slack that they will not raise quickly enough to get out of the way of the shuttle. Too much tension not only detracts from the appearance of the figure—gives it a pinched effect—but in the case of piece-dyed goods excessive tension is apt to place such a physical strain upon the filaments that the material will dye unevenly.

Although the use of wax or tallow on rayon is to be strongly condemned, there is no objection to its use on the warp in combination goods which calls for a mercerized cotton warp and rayon filling, and sometimes its use is to be recommended. The best form in which to use the tallow is in candles, and the best place to apply it is at the point where the yarn leaves the warp beam. (See Fig. 2) If applied as shown there should be no fear that enough will get on the rayon to damage the luster. The wax will have served its purpose and most of it will have disappeared by the time the yarn reaches the shuttle.

The use of tallow on mercerized warps is not advisable if the goods are to be figured with an extra warp. There is too great danger of the wax rubbing off the mercerized warp and on to the rayon warp as the threads pass each other when the sheds open and close.

In rayon-figured goods that are woven face down—which is often the case with jacquard designs—the sandpaper on the take-up roll should be replaced with felt so as not to injure the face of the goods.

If the woven material runs into boxes it is well not to press the webbing down, with the intention of getting more into the box, for wrinkles and creases that are apt to result from this action will be very difficult to remove. And if the material runs onto blocks the draught should be very light.

Uneven Picks—Thin Places

Sometimes in using even the best grades of rayon thin places will appear in the webbing. They resemble places in which all the picks were not being put in the web, or thick and thin filling. This trouble may be due to a variation in the size of the yarn, or to a peculiarity in the fabric construction, but occasionally it is due to the use of an upright quiller. In this type quiller the yarn is pulled over the top of the tube, or cop, or spool, and either more twist is put in the thread or some twist is taken out. If the quills are all made the same way little trouble will be encountered, but when one quill is made one way and the next is made in the opposite manner, the appearance in the fabric is quite pronounced. The effect on the twist by pulling the yarn over the head of a tube or spool can easily be demonstrated by using a roll of tape.

Fig. 5. Direction of twist of two-ply rayon

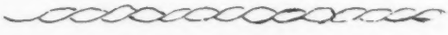


Fig. 6. Direction of twist of single rayon

Place the roll of tape on the table so that it will unwind from right to left, (Fig. 3.). If the end is grasped and pulled over the top it will be seen that a right-to-left twist is put in the unwound material. Pulling yarn over the end of a tube or spool placed in this position will take twist out of single rayon and put twist into two-ply rayon.

Turning the roll over so that the tape will unwind from left to right (Fig. 4), it will be seen that pulling yarn over the end of a tube or spool placed in this position would take twist out of two-ply rayon and put twist in single rayon. And the smaller the diameter of the tube becomes as the yarn is drawn off, the greater the effect.

The number of turns twist per inch in the single rayon that is common to the narrow fabric trade is 2½ to 3 turns, and the direction is opposite to the direction of the twist of regular twisted cotton yarns. It follows that the direction of the twist in two-ply rayon is opposite to the folding twist of regular twist two-ply cotton.

After Weaving

Unless the goods are to be piece-dyed, narrow woven rayon products usually proceed from the loom directly to the winding room. Here they are trimmed and inspected, wound on small paper tubes or on cardboards, wrapped (sometimes in tissue paper), or boxed, and forwarded to the shipping department. The less handling the goods have to undergo after weaving the better the condition in which they will be presented to the customer. It is also advisable to convert the woven goods to their ultimate form as soon as possible after weaving, for the longer they are allowed to lie in an unnatural position the less presentable will be their appearance.

Elastic goods, piece-dyed goods, and lightweight beltings require to be run through a finishing bath. With the exception of the piece-dyed goods this bath usually consists of a solution of gelatine, glucose, light starch, or transparent gum. Heavy gums or starches will dull the luster of the rayon and should be avoided unless they are applied to the back only. In this case the solution should be thick enough so that it will not easily penetrate the material, and yet not so thick that it will not run back into the size box. Piece-dyed goods usually require but plain warm water, though occasionally a small amount of gelatine or glucose may be added to the bath.

Combination fabrics present a problem to the finishing foreman that constantly taxes his ingenuity. What will work well with one combination will not always be satisfactory with another. Experimenting is his only salvation in such cases. The weight and texture of the fabric must be considered, the fugitiveness of the colors, the effect desired, etc.

An interesting effect that has appeared on the market lately is a combination fabric which is calendered after weaving. The material is so constructed that as much rayon as possible is thrown to the face. This is accomplished in the single face fabrics by employing such weaves as the 5- and 8-harness satins, or the four up and one down twill, and in the reversible goods by using a warp rib weave. Of course it is essential that the rayon be in the warp so that when the material is run through the calender the rayon threads will be running in the same direction as the polishing rolls. Great pressure is exerted upon the material at the calender—so great, in fact, that in lightweight goods the filling is severed at the edges—with the result that the finished product has an all-over gloss that resembles patent leather.

Another attractive type of finish at the calender is produced on fine grosgrain weaves by polishing the back and imposing a "water-wave" or similar effect on the face.

Rayon and Combination Braids

Mercerized cotton is used in combination with rayon in braids, both for artistic effects and economical reasons. No particular preparation of either yarn is required other than if they were to be woven. And perhaps the only necessary change at the braider is to install carriers equipped with porcelain eyes through which to run the rayon. Even this, however, is not always imperative. There is one point that might be mentioned regarding weights. Unless the weights play an important part in the figuring or construction of the fabric, such as in Ric-Rac, the rayon should be run with much lighter top and bottom weights than is used on the cotton. If the counts are similar and one size weights is employed for both materials, the cotton will show a tendency to predominate, which ordinarily is just the opposite to what is desired.

Novelties

To mention novelties is to conjure up all sorts of fancy trimmings and bindings and edgings, and to specify any one of these is to discriminate against the rest. The great multitude of effects in both weave and color combinations that can be found in only a few minutes' walk through any department store is astonishing, and their conception would have challenged even the versatile powers of Cinderella's fairy godmother.

Dyeing Fast and Uniform Shades

Machine Dyeing Increasing— Fewer Light and Dark Skeins

*By J. Wm. Walsh**

IT is very difficult to write an interesting article for publication on the dyeing of rayon unless names and real facts are divulged. When a dyer writes for a magazine he usually omits some things which would be very interesting, but cannot avoid this without giving facts which might seem to the reader as unfair.

The dyer promises such quick deliveries that his greatest handicap is lack of time. He is always racing against time and in so doing he cannot turn out the standard of work of which he is really capable. The dyeing process, therefore, is considerably cut down, but apparently it is standard work, as it is very easy to cut the dyeing process, particularly in rayon, without its being noticeable. While this can be done on rayon, it cannot on any of the other fibers, particularly tram silk or worsteds.

Washing Before Dyeing

For instance, rayon should be washed before dyeing but as a matter of fact it is never washed. The main reason is to cut time, but as it also cuts the working of the yarn, it will wind better. It can be dyed quite satisfactorily without washing, if it is in the original condition in which it is received from the rayon manufacturer. If the yarn has been processed in any way, such as twisting or made into fancy yarn, of course it must be washed to make it look as it should after dyeing. But as the yarn in this case is stronger, it will stand a good washing, and it should be done.. Rayon yarn is one fiber that can be dyed if it contains even a straight mineral oil, but it will never look as bright, nor will it be as fast either to light or washing, as if it had been washed or scoured first.

Nearly all dyers have to use an oil or a softener of some description, unless they are not particular as to the feel of the rayon after drying, as rayon dyed without it will feel very stiff and harsh and would not do in the knitting trade at all, although the winding qualities are excellent. An oil or softener should never be hygroscopic as it will attract moisture from the air and give the yarn a tendency to feel sticky and damp, and therefore wind very unsatisfactorily.

Oil is never used by the dyer to replace weight lost in dyeing. Too much would have to be used unless it were glycerine, and in either case the trouble would be terrific in the winding, due to stickiness.

Uneven Moisture Causes Defects

Rayon that leaves the dyehouse damp or not bone-dry will always give trouble. One reason is that it is never uniformly damp and the damp places in the thread will produce what are called shiners, due to the yarn stretching in the damp places, thereby producing a different tone of color than the rest of the thread. A rayon thread will lengthen out in becoming wet or damp, without even being stretched, and unlike other fibers, it will never come back to its normal length. This causes rayon goods to pucker in some places, which makes them appear a different color than the rest.

Rayon dried and dyed correctly, which means evenly, by a conscientious workman, will shrink about 3%. Manufacturers who know what they should, want this shrinkage, for then they know the yarn is dry, and uniformly dry, and will not give shiners in the finished work. No dyer can have his yarn uniform and still have it even slightly damp.

Actual Dyeing Process

There is not much to be said about the actual dyeing process itself,

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as that is the dyer's own struggle to work out as experience has taught him. There are no set rules for the process. Each individual lot is its own problem. The dyer does have, in each case, general rules such as keeping the yarn even in color and in good winding condition.

A dyer once applied for a position, saying he could get rayon out of the kettle in three turns. The writer replied that we did not want rayon which was dyed in three turns, as it is only colored, not dyed, in so short a time.

It is very easy to color rayon either in a warm, hot, or boiling bath, and with substantive (direct), basic or vat colors. The substantive colors are almost generally used, except for extremely fast work; then the vat colors are used. Basic colors will fade after a few hours, even under artificial light, and are very fugitive to washing, unless put on a tannic acid and antimony salt bottom, and then again topped by the same method, which leaves the rayon dull in appearance and worked to death. The only advantage they have is their brightness.

Matching Silk Shades

Tram silk dyed with basic colors is legitimate, as they are much faster on this fiber than on any other. If a customer, however, should send in a basic-dyed tram sample to be matched on rayon, the dyer would have to use a dye of the basic group in order to get an exact match of the sample. In a case of this kind, the manufacturer should be informed by the dyer as to the truth, and he would quickly taboo the basic method of dyeing.

Direct colors on rayon are very much faster than a direct color on cotton, and in many cases they are as fast to light as a vat color is on cotton. Manufacturers are inclined to confuse the names of the different groups or types of dyes. For instance, vat colors include Indanthrene, Argol, Anthrene, and a few others. They are all dyed practically by the same method, which is caustic and hydrosulphite. The vat dyes are commonly called Indanthrenes as they were the first dyes of this description to come out.

Substantive colors, commonly called Direct colors, also include Chlorantine, Solamine, Fastusol, Nathamine, Diamine, Chloramine, Pontamine, etc., each manufacturer having his own name. Substantive colors become faster, when dyed on rayon, the hotter the dyebath is made, but will look very well dyed at a low temperature. Of course they must be brought to the boil in dyeing cotton before they really develop at all, so it stands to reason that the hotter the dyebath on rayon, the brighter they will look.

Machine Dyeing Increasing

Hand kettle dyeing, except for small lots, is fast becoming obsolete and well it should, as the handling that was required to keep a lot even and bring the bath to the necessary temperature was enough to make any rayon tangled and produce broken filaments.

A dyer will sometimes say that rayon cannot be dyed on this machine or that machine, but it all depends upon the method of handling, for someone is doing beautiful work on the same make machine that he condemned. A machine that is steady and changes the position of the yarn slowly, without tangling, can be used and when the dyer once gets the hang of it, he will think it the best, no mater what type it is. Of course some machines are not as adaptable as others for vat colors, but this can be overcome in some instances with thought.

A reel machine, on account of its rotating out of the dyebath, will exhaust the hydrosulphite a little more rapidly than a machine where the yarn is only brought slightly out of the bath, but by using more hydrosulphite this difficulty may be overcome. When the hydrosulphite is exhausted from the dye liquor, the rayon will go uneven.

There is a cure for every ill that a machine put out for rayon dyeing may have. What the dyer really wants, and the machine men think they have, is a machine that will turn out work in such wonderful shape that it will require no finishing. There is no such machine and it is not required, for the rayon should be finished the same as it always has been; possibly cutting down a trifle.

A batch of rayon handled long and fairly roughly in a hand kettle, but well finished after drying, will wind better than rayon dyed on any machine with the finishing cut down, or cut out entirely. This same thing is true in regard to tram silk, or any fine yarn. A dyer can sort of feel his way in dyeing other fibers, but he can go wrong in a minute, with no warning, in dyeing rayon, and as the fiber is tender, it is very difficult to make corrections without damaging the yarn.

Light and Dark Skeins

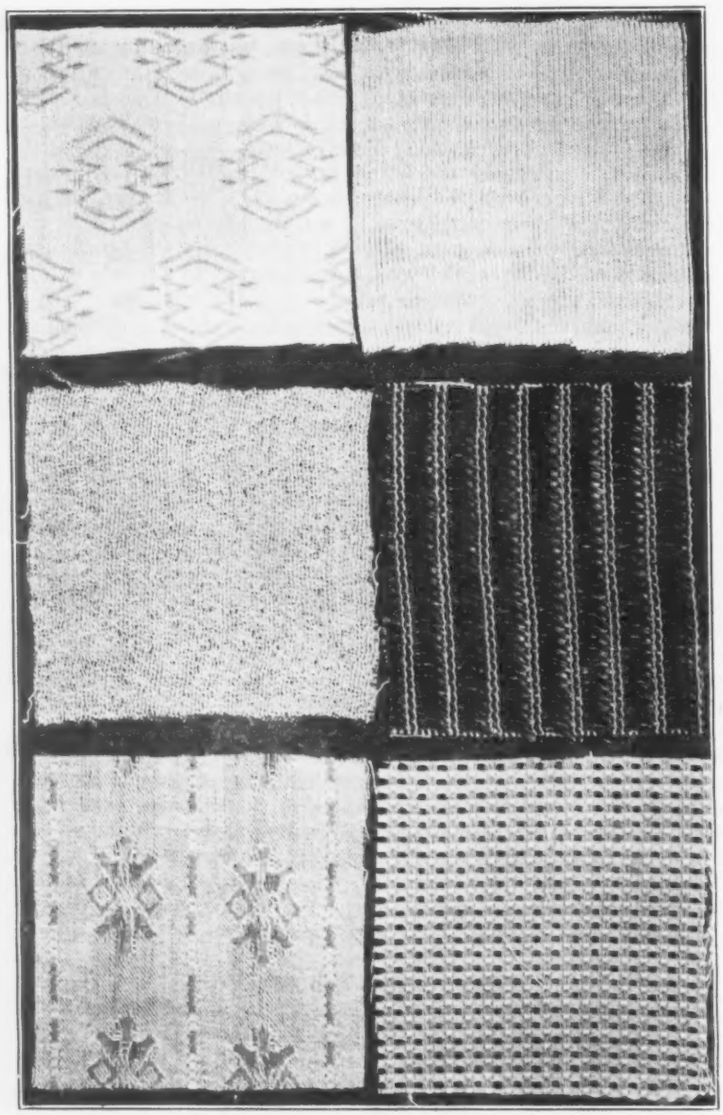
The light and dark skein nuisance, so familiar to the dyer, has been reduced to a minimum by the rayon manufacturer, and we think by this time that all know it is impossible for the dyer to remedy this trouble. It is as impossible to stop as it is for a person to make two different growths of the same kind of wood identical, so that when it is varnished it will have the same appearance. The dyers formerly bleached the yarn in order to do away with this trouble, but it was of no avail. The light and dark skein horror was much the same as the uneven drying of warps or skein yarn after the mercerizing process.

If the yarn was not dried thoroughly and evenly after mercerizing, and was sent to the dyer for dyeing, it was impossible to keep it even in shade, although he wet all the yarn out in a boiling bath before he dyed it. This does not seem reasonable, but it is a fact well known by the dyers of mercerized yarn. We are of the opinion that some such technical error causes light and dark skein trouble in rayon dyeing.

There is no one in the line of manufacturing who can get a better head on rayon, or any other yarn, than the dyer during the dyeing process. He is the chemist. The dyehouse is his laboratory, and the dye liquor his indicator, everything shown up. Many manufacturers who have confidence in their dyers always send a sample of the rayon which they contemplate buying, to the dyer, to get a report on what the yarn really is, before making a decision.

It is up to the dyer to be on his toes, ready to make any change in his methods of dyeing, to cope with new yarn, if he is not familiar with it. He must not be too hasty in making any statement he cannot back up, for some other fellow who is getting beautiful results with the same quality of yarn might show him how it is done.

COTTON AND RAYON MIXTURE DESIGNS



Reading from Left to Right: Top, Rayon-Filled Broadcloth Shirting, Rayon-Filled Bengaline; Middle, Cotton-Warp and Rayon-Filled Crepe, Rayon-Filled Chenille; Bottom, Rayon-Filled Madras, Broadcloth with Cotton and Rayon in Both Warp and Filling

Effective Use of Rayon in Designing Various Classes of Knit Goods*

Typical Patterns in Hosiery, Underwear, and Outerwear Fabrics—Unique Effects with Skein-Dyed Yarns

By Gilbert R. Merrill

THE early use of rayon by the knitting industry, and the present large consumption, show how well the designers of knit goods have appreciated the opportunities in using it to stimulate interest in their products. It is interesting to note that a fiber which generally weakens when wet should be so largely used in hosiery and underwear, which are articles that require very frequent laundering. Yet in spite of this apparent handicap, the use of rayon in hosiery and underwear has grown enormously. It might almost be said that the use in these industries has extended in direct ratio to the growth in the production of rayon yarns.

Products for which rayon is used in the knit goods industry are underwear, dress goods, suitings, sweaters and jackets, scarfs, caps, hosiery, and neckties. From the point of view of the designer, the use of rayon in knit goods comes under three classifications: First, tubing or webbing; second, hosiery; and third, other types of outerwear. This classification results from the very different characters of the machines used and also from the differences existing in the use of the product of these machines.

Tubing or Webbing

It would seem that there should be no trouble in the use of rayon when manufacturing plain colored tubing, but there is need for constant care to prevent banded effects. These are due to various causes, but are the result of the yarn of one or more feeds appearing a different color than the rest of the fabric. Banded material has sometimes been disposed of through the retailer in short lengths suitable to make single undergarments. Some retailers claim the band was intentional.

The use of drop stitch patterns is a fairly common type of design to give vertical stripe effects and offers few problems. These effects can be narrow or wide as desired. Extreme width does not seem particularly desirable because of the chance for the horizontal yarns in the stripe to fray and break much sooner than the rest of the fabric. Fig. 1 illustrates a fairly broad drop stitch.

The production of crepe or pebble effects is commonly accomplished by the use of tuck stitches. These effects are most common in the coarser fabrics for scarfs and dress goods, and are obtained by the use of tuck pressers with spring needle machines, with trick wheels for latch needle machines, or by the use of two lengths of latch needles on machines with two cam raceways.

Figs. 1 and 2 both illustrate types of crepe effects caused by using tuck stitch. In Fig. 1 the tucking is in a regular pattern, while in Fig. 2 the pattern is irregular and broken to give this effect.

Rayon is often used twisted with other fibers, especially twisted with worsted to make a mixed effect. In this use it adds luster to the worsted and gives a chance for two-color effects. Often the wool is dyed and the rayon is left natural, as is illustrated in Fig. 3, a worsted and rayon jersey, with the worsted blue and the rayon white. Material of this sort is cut up for sweaters and for dress goods.

Rayon at one or more feeds is frequently used with cotton and wool at the other feeds for underwear fabrics. In rib fabrics it is sometimes allowed to knit on both sets of needles, while at other times it knits on the cylinder needles only, giving a course of plain stitch like that used in a welt. Care must be used in starting up a line of these mixed goods, as under some conditions the rayon will prevent using the tube for the size commonly made from a machine of a given diameter when only cotton or wool is used.

There is a small quantity of rayon and cotton or wool underwear fabric made by plating the rayon over the other yarn. These are most commonly used for infants' wear.

Some jacquard patterns are produced in connection with the large circular machines. When plain fabric is used, the pattern is made with either a tuck or a draw stitch. This type of pattern is illustrated in Fig. 4. The fabric is of white rayon yarns and the pattern is due entirely to tuck stitch in the plain fabric.

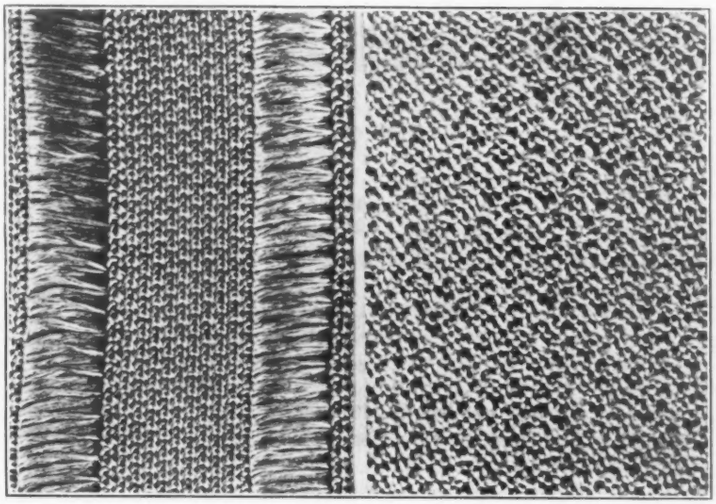


Fig. 1. Drop Stitch and Crepe Effect

Fig. 2. Crepe Effect, Irregular Pattern

In rib fabrics the pattern usually results from the use of the draw stitch on one set of needles. Feeds are often set up to alternate on rayon and worsted and the machine is arranged to draw rayon yarns only in certain needles, and worsted only on the other needles. This gives a rayon design on a worsted background. Fig. 5 is a photograph of a rib fabric of this sort. As the pattern is large, only a small portion is shown, but it is enough to illustrate the pattern effect obtained. Jacquard fabrics like these two are used for dresses, coats, capes or even golf hose.

Rayon in Hosiery

The use of rayon in the hosiery section preceded its use in the underwear section. In the early days, as today, it was much used for plain colored stockings. In a sense there is no designing in this type of work, but it is interesting to note that the field of fully fashioned hosiery, which has been so exclusively silk, is now opening to the use of rayon.

Now that nets and open-work patterns are being taken up again, it is very likely that rayon will be used. The circular knit field with tuck or floating stitches is likely to produce imitations of the real transferred loop open work, and it may be that some rayon will be used in fully fashioned open-work patterns.

Fig. 6 shows a diamond pattern from a circular knit rayon stocking.

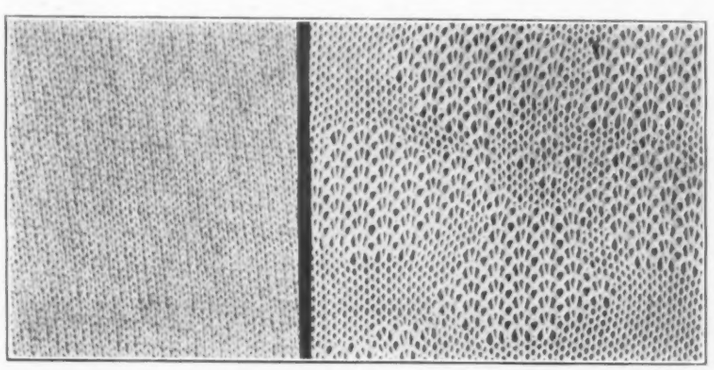


Fig. 3. Rayon and Worsted Twisted

Fig. 4. Plain Stitch Jacquard Pattern

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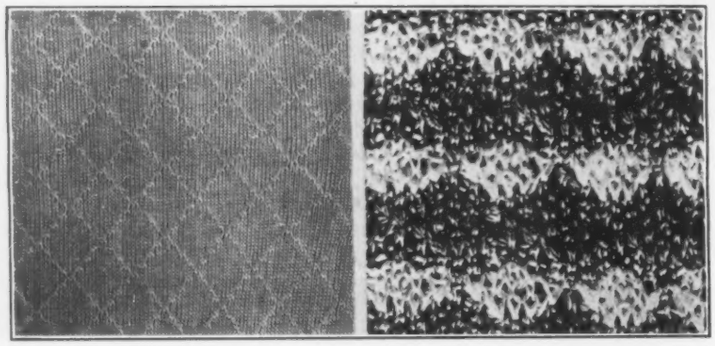


Fig. 6. Hosiery Pattern *Fig. 7. Circular Tie Pattern*

This gives an idea of certain present patterns. Modification of this type of pattern can produce various novelty effects.

In hosiery manufacture, most of the use of rayon for designing is by plating, coupled with cross-dyeing. There is, of course, the twisted rayon and cotton or wool which give the mixed color effects similar to those spoken of for underwear and shown in Fig. 3. Then there are the vertical stripe effects produced by reverse plating on one or more needles. At first this was done with bent needles, but the later developments are to use reverse plating sinkers which give a more positive turning in the reverse plating line. This reverse plating principle has been very much elaborated upon by pattern mechanisms which control the reverse plating to give various patterns.

In addition to plating, there is also the floating stitch, where the yarn is not caught by the needle but floats inside the stocking behind the fabric. The pattern effect is similar to that of reverse plating, but some care should be used to avoid long floats as they may catch as the stocking is being put on, or may cause the stocking to have a pebbled or puckered-up surface if the floating yarn is too short for the fabric knitted in front of it.

Some rather unique hosiery patterns have been produced with skein-dyed rayon yarns. Often these effects involve dyeing the skein two or three colors. The skein must be the proper length to go with the stocking being knitted or the desired result will not be obtained. The proper length skein is dyed the lightest color desired. Then the skein is dyed on one end only, the length of color desired determining how much of the skein is in the dye bath. Finally, the other end of the skein is dyed the third color and the yarn is wound for knitting. This yarn is usually used as the back yarn in connection with reverse plated patterns. The result is that the reverse plating shows three different colors at different places. If the face yarn is not too heavy, the back yarn will show through enough to give a faint tint of each color at the points where each is. This adds an additional touch to the design of the stocking.

While drop stitch effects have been common in hosiery, they are less seen today than formerly. These effects are commonly obtained today by the use of special sinkers. This makes it possible to produce an apparent drop stitch with all the needles in the machine, which eliminates any complications in knitting the heels and toes.

Other Outerwear

In the line of neckties, the most common thing is the circular knit tie with tuck stitch patterns changing to a plain tube for the collar band section. Most of the patterns used are made with trick wheels. Fig. 7 shows an inexpensive combination of yarns in this type of tie.

A certain number of the knitted neckties are made of tricot warp-knit fabric cut up as ordinary woven fabric. Bands, the proper width for single ties, are knit on ordinary raschel machines. Wide stripes and small checks are commonly made on regular tricot machines, while a variety of color effects and open-work are produced on raschel machines with or without a jacquard attachment. Fig. 8 shows two open-pattern warp-knit patterns used for ties. The upper pattern is all brown, except the partly hidden yarn making white rectangles behind the brown. The lower pattern has two wales red and the next two black, giving holes outlined in these two colors.

Scarfs of the filling-knit type are commonly made with patterns of the same class as used for neckties. Tuck patterns in solid colors and mixed colors are produced with trick wheels and on machines with needles of two lengths. Medium sizes of plain circular machine may be equipped with a jacquard to produce tubes of the proper width for scarfs having jacquard patterns like Fig. 4.

Two raschel scarf patterns are shown in Fig. 9. The upper pattern is one of the common rib effects produced with different warp color arrangements. In this case, the racking is over eight needles and back, producing the zig-zag effect shown, which is reversible. The lower pattern is one with vertical color stripes, but with some open-work and raised effects also. Patterns of this type are basically rib stitch, but at

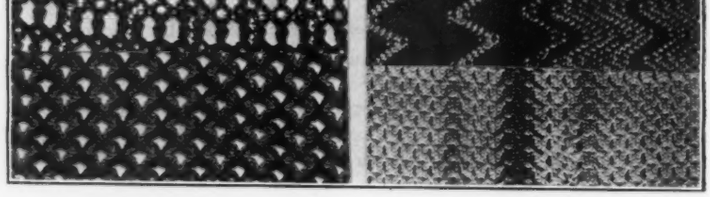


Fig. 8. Raschel Tie Patterns *Fig. 9. Raschel Scarf Patterns*

times one bed is idle while the other knits several courses, which makes something of a knop effect. This scarf is not reversible.

In the warp knitting line, the raschel jacquard open-work patterns are the most striking and offer an interesting contrast to other styles because of the lace-like patterns possible. One sample of this type of pattern is illustrated in Fig. 10. Usually these are of one color, the lace-work supplying the entire design. The patterns may be small, repeating many times, or the entire scarf may have but one complete pattern. On these scarfs the fringes are two series of knitted cords made as integral parts of the scarf on the knitting machine.

There is a considerable variety in the use of rayon in sweater manufacture. A certain number of ladies' sweaters are made up of all-rayon. These usually have some tuck stitch patterns described under the heading of tubing. Patterns like Figs. 1, 2, 3 and 4 are used for this work. Worsted and rayon are combined in simple pattern effects where there is a rayon pattern on a worsted ground. Stripes and checks are common, while a few jacquard effects, like that shown in Fig. 5, are found.

The use of rayon in designing of knit goods is, then, very extensive. There is hardly a field where it is not used to some extent. The development from so many perfectly plain knitted garments to the wide variety of patterns in vogue today has doubtless helped to increase the demand for knit goods, which, in turn has stimulated designers to further and better patterns. It doubtless is a gradually widening circle, in which rayon has been a great stimulant to both producer and consumer.

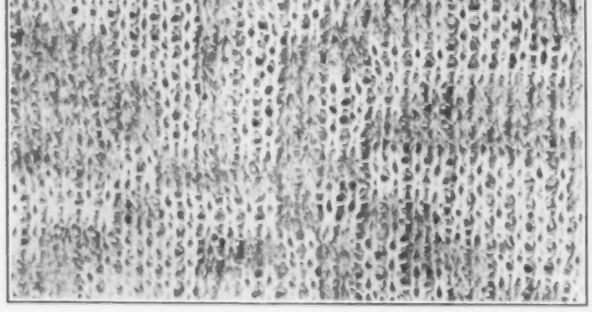


Fig. 5. Rib Stitch Jacquard Pattern

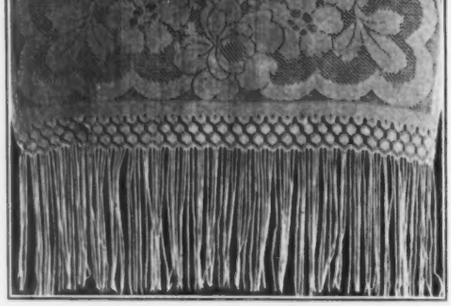


Fig. 10. Raschel Plain Stitch Jacquard Scarf

A Year's Progress in Rayon by Producers, Equipment Builders, and Mills

As in Previous Years, the Greatest Credit Must be Given to Rayon Manufacturers

*By James W. Cox, Jr.**

The purpose of this article is to present the opinion of the author as to the progress made in this country during the last year. It is, of course, realized that the experiences of one person or his organization, no matter how varied their work may be in the textile industry, cannot possibly cover every phase and improvement in the entire industry. The author would, therefore, welcome any information on important technical developments not known to him. As this article is a brief history of the progress made, the various matters can be treated only in a general way. The allotted space also precludes the discussion of European developments in detail, except where they directly affect American mill operation.

RAYON has been used more in the last year in the textile industry than ever before, and is even more firmly intrenched than ever as a staple raw material. The growth has been so rapid that it is difficult for anyone to keep up with the progress, even if continually busy in the various branches of the industry where rayon is employed. The improvements in the yarn, particularly in the composition of rayon itself, have been so rapid, that keen textile manufacturers have been obliged to change their methods with these developments if the best results were to be obtained. The changes, however, have been decidedly for the better and have made the handling of rayon much easier in the textile mill.

Improvement in Three Principal Ways

In this article, the writer is dividing the improvement in rayon as it affects the textile industry, in the same three general divisions used a year ago in his article of September 24, 1927, in TEXTILE WORLD, which are as follows:

(A) The yarn as produced by the rayon manufacturer:
- (a) Chemical composition
- (b) Physical make-up
- (c) Condition, quality, and form in which delivered

(B) Equipment for handling in textile mills:
- (a) Machines
- (b) Appliances
- (c) Auxiliary equipment

(C) Methods of handling in textile mills:
- (a) Chemical
- (b) Physical
- (c) Mechanical

In the opinion of the writer, the greatest progress during the year has been made, without a doubt, by the rayon manufacturers themselves, as (A) above; the next largest advance is in the methods of handling in the textile mills, as (C) above; and the least in machinery and equipment development, as (B) above.

The various improvements in rayon yarns during the last year are taken up under various headings as follows: Type or Process, Degree of Bleach, Yarn Size (Denier), Number of Filaments, General Properties, Quality (Grade).

As to Type

Two years ago, the improvements made in the cuprammonium type yarn were much ahead of those made by the viscose, nitro-cellulose and acetate processes. One year ago, the four types were pretty near equal. Of course it rests entirely with the individual manufacturer as to which type will lead.

As to Degree of Bleach

The maintaining of an even, or definite, degree of bleach in rayon yarns by the manufacturer and afterwards in textile plants, still seems to be a more difficult proposition than with cotton yarns, but the progress has been great. The knowledge by the rayon manufacturers of the proper degree of bleach necessary in the textile trade has been gradually becoming better. The general average trend in most materials in the cotton and silk branches of the industry to be piece-dyed or printed, or both, has been of great assistance in lessening bleach troubles, as a large part of all troubles caused by bleached and over-bleached rayon have been with yarn-dyed materials.

Fortunately, the average textile mill man, as well as the cotton goods and silk fabric converter, has at last awakened to the fact that the degree of bleach in the yarn as received from the rayon manufacturer is a very vital factor in the final quality of the goods, made wholly, or in part, from rayon yarns. This has led to a larger proportion of rayon yarns being sold by the manufacturers in either an unbleached or slightly bleached state, as compared to former years. It has lessened the troubles and difficulties in manufacturing, with less spoiled goods.

As to Yarn Size (Denier)

An easy way to note the changes in the size (denier) of American-made yarns is to compare the tables given at Figs. 1 and 2. The table at Fig. 1 shows the denier and filament number of all American commercial rayon yarns as of July, 1927. The table at Fig. 2 gives the same for August, 1928.

By referring to these tables, it can be seen that:

(1) A year ago, the finest yarn was a 40 denier with 30 filaments. This yarn is still being made, but a 35 denier yarn of 8 filaments has

* Consulting Textile Specialist, 320 Broadway, New York.

AMERICAN COMMERCIAL RAYON YARNS GIVING DENIER AND FILAMENT NUMBER

DENIERS	40	45	55	60	65	75	80	85	90	95	100	110	120	125	130	140	150	160	170	175	180	200	240	250	300	360	450	600	900	QUALITIES
I. Viscose Process																														
The Viscose Company						18					18			18			21			27		30		36	44		54	72		
																	24													
																	36													A-B-C
																	60													
Du Pont Rayon Company																	24		24			30			40		48		120	Regular
							30				40						60		60			80								Super-extra
Industrial Fibre Company, Inc.																	24								44					A-B-C and D
The Belamose Corporation																	22								42		42	66	66	For 300 and below
																	42										66			A-B-C-Inf. and SR
																	66													Above 300 I-II and SR
Acme Rayon Corporation																									44					Not stated
Delaware Rayon Company																	22					36			44					A-B-C-Inf.
Skenandoa Rayon																	24													A-B-C
II. Nitro-Cell. Process																														
Tubize Art. Silk Company			10		10	10		10	20	10	20	20	20		20	20	23	20	20											
					18	18		18							30	30	30	30	30											A-B-C
III. Acetate Process																														
Celanese Corporation of America		10				20					26						26		40			40								
																	40								52					One only
IV. Cupra-Amm. Process																														
American Bemberg Corporation	30			45			60				75		90				112				135		180		225	270				"A" and "M."
Napon Rayon Corporation																	36													A

Fig. 1. Denier and Filament Number of American Rayon Yarns as of July, 1927. (Compiled by Author)

appeared, finer in yarn size but greater in individual filament size.

(2) There were 29 different denier yarns on the market last year, against 31 at present.

(3) There were 80 yarns being made last year, to 84 this year, showing some tendency toward more diversification.

(4) One denier yarn, i. e., 150, is made by all the manufacturers, with one exception, 18 varieties being purchasable last year, to 19 now.

(5) Eight varieties of 300 denier, the next important, can be purchased this year as last.

(6) Eight varieties of 100 denier can be purchased this year against 5 last year, showing a decided increase in the use of 100 denier yarn.

(7) A decided tendency towards finer filaments.

As a general rule, it can be said that the yarns in the market are more diversified as to denier today than they were a year ago, thus affording the textile manufacturer a wider choice of yarns for any particular purpose.

As to Filaments

There has been a very strong trend among most rayon manufacturers during the last year to produce finer filament yarns. This has been a great advance and enabled textile manufacturers to purchase softer, more pliable, or, in general, yarns with a better handle and feel. The knitgoods branch of the industry has perhaps benefited more by this improvement than the various weaving branches, with the one possible exception of pile fabrics.

The comparison of the two tables, mentioned under the previous heading, shows the rapid advance made in this particular factor. The materials made with finer filament yarns have been decidedly better quality than those made with yarns of ordinary size filaments. Consequently, the market for the fine filament yarns has expanded in a remarkable manner.

The much discussed hollow filament yarns have not, up to the present time, been in the slightest degree a factor in the market. They have not been produced commercially in this country. Whether or not they will ever be a factor remains to be seen, but it is the opinion of the writer that the multi-filament, i. e., fine filament yarn of today, will probably obviate the necessity for a hollow filament yarn, as the former will produce a sufficiently soft and pliable material.

One make of multi-filament yarn on the market which came to the writer's attention recently, was so very good, having the silk "crinkle" and "crunch," that a person might easily have taken it to be real silk. The filaments were the same size as the filaments in the better grade silk yarns.

There is no commercial yarn today employing a much finer filament than on the market a year ago, but there is a more general use of finer filaments. A number of manufacturers have experimented with very fine filaments, but they have generally returned to approximately 1.3 denier, irrespective of the size of the yarn.

The greatest detriment to the fine filament yarn of today, seems to be the number of broken filaments in grade A yarns. If this condition is overcome, which it undoubtedly will be, it will be of great assistance to the textile manufacturer.

As to General Properties

The strength of the average 150 denier American-made yarn under normal atmospheric conditions, is still about 6-7 ounces per individual strand. The strength of certain yarns of the same denier in the wet state has been considerably increased over last year. This is of great help to the finisher, whose greatest problem has been not to stretch, distort, or, in general, spoil rayon materials when wet.

On the average, yarns are not any stronger today than they were a year ago. There are two exceptions to this, however, two manufacturers having improved the strength of their yarns, which were formerly quite weak in comparison to most others. There has been only a slight improvement in the reduction in the elongation before break, or stretch, with most manufacturers. None with some. One cuprammonium manufacturer has cut the elongation before break in half, a most remarkable and commendable achievement. Any lessening in stretch, and consequent improvement in elasticity as above, naturally reduces the necessity of using such relatively high amounts of twist when the yarns are used for warp.

There is a general tendency, except with one type, to get less luster, which is certainly a good thing.

As to Quality (Grade)

The gradual improvement in chemical composition and better handling in the rayon manufacturer's plant as to skeining, winding on bobbins, spools, etc., has improved the quality of almost all yarns to a considerable degree. There is yet, however, a decided chance for improvement in some particular brands. The ordinary size filament yarns have progressed more as to quality of physical put-up than the fine filament yarns heretofore mentioned.

Nearly all rayon manufacturers seem to realize that it is quite necessary to be more particular in the absolute grading of their qualities in their plants, as that is of great importance to the textile manufacturer.

There is no uniform standard for grades A, B, C, the greatest variance being shown between different brands in the B grade. It would seem as if the Rayon Institute, or some association of rayon manufacturers, should be able to correct this situation.

The rayon manufacturers have practically all adopted a standard size skein and a uniform method of lacing. There are a few exceptions, however. It is hoped that this will be changed before long, thus enabling the textile mills to standardize their winding machinery with consequent ease of handling.

Assistance to Mills by Rayon Manufacturers

The practice, started a few years ago by some of the rayon producers, of having experienced technical men in their organizations ready to go to any mills in trouble and desiring help on methods of handling or general processing, has been of great benefit. Two more rayon manufacturers have inaugurated this type of service during the past year, and one in particular has greatly broadened this service by maintaining a complete physical, mechanical, chemical, and microscopical laboratory in their New York office, as well as at the plant, and increasing the number of men on the staff available to visit textile mills.

The issuing of booklets and printed instructions has also been of great interest to the trade. Generally speaking, the textile world has a better knowledge of rayon than ever before, due almost entirely to the rayon producers.

Improvements in Equipment

The year 1928 has been very much like 1927 in reagrd to improvements in machinery, appliances, and equipment for handling rayon in textile mills, i. e., not very great, but a steady, slow advance, mostly on refinements of existing machinery.

The greatest advance has been, as last year, in the more general use of silk machinery for rayon processing, instead of attempting to make over cotton, woolen or worsted machinery. With few exceptions, silk machinery is better adapted to handle rayon and its use normally makes for ease and speed in handling.

Perhaps the greatest advance in the textile machinery and equipment for handling rayon, has been in the knitting field, where changes, coupled with the improvement in the yarn, have worked wonders.

Improvement in Mill Handling

There has been a small, but general, advance in the methods of handling rayon in textile mills as a whole. The keenest textile manufacturers have not made as much progress in handling during 1928 as in 1927, because of the fact that 1927 showed such great improvements.

A great many mills still blunder and stumble along, insisting upon handling rayon in the same manner as cotton, woolen or worsted yarns, and consequently are still having trouble. Complaints as to quality of their product and lack of business, has, however, been a great spur.

Bleaching and Dyeing Yarn

The commission bleachers and dyers of yarn, and the large plants having their own dyehouses, have progressed somewhat. The average small plant, however, still seems to insist that it knows all about the bleaching and dyeing of rayon yarns, and still has a great deal of trouble, particularly on account of rough handling and too-rapid drying. As was the case a year ago, the cuprammonium type of yarn generally offers the least trouble to the average dyer. The viscose type seems to offer next less trouble, followed by the nitro-cellulose and acetate types, respectively.

Winding

The study given by some mill superintendents and foremen to the winding of rayon, plus the assistance given by the technical textile mill men employed by the rayon producers, has been a great step in improving the quality of the winding, as well as the amount done per unit of time. The more universal use of silk winding machinery has been a great boon. With few exceptions, shiners, due to faulty winding, have been practically done away with.

Perhaps at this time the tying of proper knots is the problem which has been given least attention and therefore causes trouble. If a mill

is having trouble along this line, a request to most rayon manufacturers will bring a man to instruct employes as to the best and easiest method.

Sizing Yarns

There has been continual progress in the matter of sizing yarns. Warp sizing machines have been slowly improved, and if rayon warps are handled on modern machines in the way that the manufacturers of the machines recommend, no trouble results. Lack of care in maintaining definite speeds, consistency of size and level of size solution in the size box, have been the greatest detriments to even sizing. A much debated point is whether or not squeeze rolls should be used, and if so, how much pressure should be exerted on the yarn.

Most textile mills seem to have given up the idea that rayon cannot be sized without excessive stretch, with consequent beneficial results later on. There are but relatively few concerns that size in skein form at the present time, and this in itself is a great advance.

Warping and Beaming

There has been considerable improvement in the warping and beaming of rayon yarns, and the former tendency to excessively stretch the yarn has been, to a great extent, done away with. The stretching of the yarn at his point undoubtedly made it easier for the warping, beaming and weaving departments, but it raised havoc with the goods in finishing, as well as with ultimate appearance and wear.

Trouble from section marks when using horizontal warpers is still prevalent. Care in tension, settings and speed will generally eliminate all trouble of this nature.

Weaving Rayon

There has been a fair amount of progress made in weaving, although there are a great many boss weavers and loomfixers who still put more tension on the rayon warp, or in the shuttle, than is good for the cloth. Perhaps the greatest advance has been the more universal use of the proper types of flat steel heddles. Improved reeds have also been of some assistance. There have been put on the market several improved looms, which are undoubtedly better for weaving rayon yarns than the ordinary cotton, woolen, or worsted types. They, for the most part, adopt silk principles to the weaving of rayon.

The practice of weaving material having a cotton ground warp and a rayon stripe warp, with too much tension on the rayon warp beam, and little on the cotton warp beam, has, fortunately, been eliminated almost entirely. This has immediately resulted in improving the quality of these materials, with consequent less trouble and financial losses.

Finishing in Piece Form

The silk finishers have, on the average, maintained their superiority in finishing all-rayon, rayon and silk, or rayon and cotton materials, the cotton finisher generally not being quite as careful and painstaking as the former. There are individual cases, however, of cotton goods finishing plants which do just as good work as the silk finishers. This is because the former have adopted care and control as their watch-words.

The most important facts affecting proper finishing of rayon materials seem to be exactly the same today as last year, i.e., care and diligence in handling the cloth, as to:

(1) Strain exerted warpways
(2) Strain exerted fillingways
(3) General handling
(4) Control of bleaching conditions
(5) Use of open instead of kier bleach where possible
(6) Control of dye-bath temperatures
(7) Control of drying temperature and rate of drying
(8) Moisture content of cloth leaving dryer.

Knit Goods

The knit goods branch of the industry has decidedly taken the lead in new and better methods of handling rayon yarn, thus creating new and better products. Most rayon manufacturers realized that, inasmuch as they could deliver knitters much better rayon yarn this year than ever before, if they assisted the mill in handling the yarn in a better way, that great results would be accomplished, and this has been precisely the case.

Improvements have been made in all types of knitted products, but the greatest improvement has undoubtedly been in the production of stockings, some of which can be said to be practically as good as those made entirely of silk.

Summary

Summing up the progress made during the last year in the manufacture and use of rayon in this country, the writer is decidedly of the opinion that the greatest advances have been made by the rayon manufacturers; secondly, by most knit goods manufacturers; thirdly, by a minority of keen weaving and finishing plants; and lastly, by the manufacturers of equipment and machinery for rayon use.

It is further the writer's opinion that the use of rayon in textile fabrics will be more universal, with greater profit to the mills, if textile men in general will give anywhere near as much thought, time and care, to doing their part as the rayon manufacturers are doing. The opportunity is there, and it would seem that it should be grasped.

One Rayon Plant in Greece

The only rayon producing company in Greece is the Soc. Anon. de Soie Artificielle of Athens. The production now is at the rate of 500 kilos per day and this is to be doubled, after which the possibilities of the development of the acetate process will be explored and already a company has been formed for the latter purpose.

AMERICAN COMMERCIAL RAYON YARNS GIVING DENIER AND FILAMENT NUMBER

DENIERS	35	40	45	50	55	60	65	75	80	85	90	100	110	120	125	130	140	150	160	170	175	180	200	240	250	300	360	450	600	900	1200	QUALITIES
I. Viscose Process								18				18			18			21		27			30		36	44		54	72			
The Viscose Company												40						24					60									A-B-C
																		36														
																		60														
Du Pont Rayon Co.																		24		24			30			40		72	96	144		Regular A-B-C
							26		30			40			50			60		60			80									Super-extra 1st-2nd
Industrial Rayon Corp.																		24								44						A-B-C and D
The Belamose Corporation																		22								42		66	66	126	126	For 300 and below
																		42														A-B-C-Inf. and SR
																		66														Above 300 I-II and SR
Acme Rayon Corp.																										44						A-B-C and D
Delaware Rayon Co.																		24								44		60	88	132	176	A-B-C
																		30														
Skenandoa Rayon Corp.																		24														A-B-C
II. Nitro-Cell. Process																																
Tubize Art. Silk Co. of America	8			12				18				20			30	30	30	30	30	30												A-B-C
												26						40														
III. Acetate Process																																
Celanese Corp. of America				10		13			20				26					26		40			40			52						One only
																		40														
IV. Cupra-Amm. Process																																
American Bemberg Corp.		30					45			60			75		90			112			135		180		225	270	336	443				"A" and "M"
Napon Rayon Corp.												60		75				90														A-B-C

Revised August, 1928, by JAMES W. COX, Jr., Consulting Textile Specialist, 320 Broadway, New York City

Fig. 2. Revised Table of Deniers and Filament Numbers; Compare with Table at Fig. 1

Graphical Methods Greatly Simplify the Solution Of Rayon Mathematical Problems

Charts for Finding Equivalent Cotton and Worsted Counts and Counts of Combination Yarns

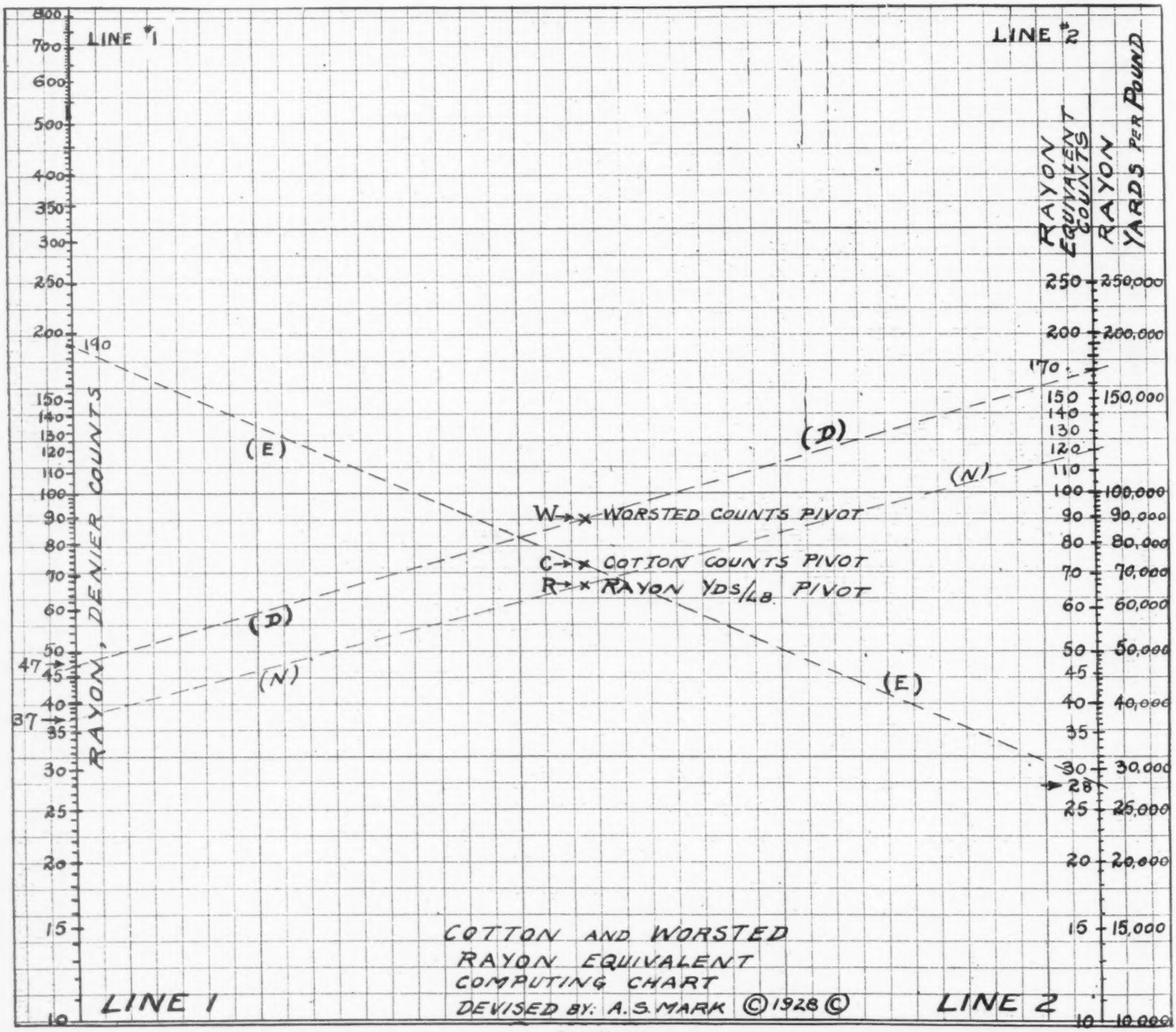
By A. S. Mark

ALONG with the growth of the rayon industry the number of mathematical problems confronting the manufacturer has grown as well, so that it becomes necessary to devise ways and means for solving these problems with the least possible waste of time or mental effort, as the time element in this age of mass production has to be seriously considered.

It is the writer's intention to show by working out actual examples the feasibility of using modern calculating methods in the solution of practical problems that come up daily, problems that are being solved at the present time in the long-handed method of pencil and paper calculation that takes considerable time and allows the possibility of an error to exist in every step. The solution of these problems will be undertaken in a non-technical way so that the lay mind will be able to follow the graphical solution, step by step, without the slightest difficulty.

Equivalent Counts

Supposing a mill is working on mixtures of rayon and cotton, worsted and rayon, etc. It is then imperative that we know the cotton or worsted equivalent of the rayon denier, or vice versa. Therefore we shall devise a chart which will give us instantly and without a single



First Chart

calculation the cotton or worsted equivalent of any denier of rayon.

We shall not go into the details of the construction of a logarithmic chart at the present time, as it would unduly lengthen the article. Suffice it to say that it is by far superior to the regular co-ordinate system of charts plotted on the X and Y axis, and anyone without any technical knowledge whatsoever can solve the various problems that these charts are designed for.

The first chart consists of a vertical line No. 1, which is the denier line, and on this the denier counts can be easily read from 10 to 800. Line No. 2 at the extreme right is the cotton or worsted equivalent line. The scale as printed is considerably reduced to save space, and yet it is plain enough to show the merits of this new method of calculating. In the center of the chart we have three pivot points. The first point *W* is to be used for worsted counts; the second point *C*, for cotton; and the third *R*, for the weight of rayon in yards per pound.

Example Showing Advantages

Example: Supposing we want to find, first, the worsted equivalent of 47-denier rayon; and, second, the cotton equivalent of 190-denier rayon. The quickest and the shortest present-day method of getting these two answers is by using the formula, as follows:

1. Worsted equivalent counts of 47-denier rayon:

$$\frac{4{,}464{,}528}{560 \times 47} = \frac{5314}{47} = 170 \text{ worsted equivalent.}$$

2. Cotton equivalent counts of 190-denier rayon:

$$\frac{4{,}464{,}528}{840 \times 190} = \frac{7972}{190} = 28\text{s cotton equivalent.}$$

It is seen that the above two examples involve rather long multiplications and divisions, and in every one of the different operations there is present the chance of making an error. The length of time taken in solving these problems varies with the individual and the means available. The means may include calculating machines, slide rules, etc., but even with those it would take about five minutes to get the two answers. I shall now solve the two problems and get the answers, not in five minutes, or four, or three, but in two seconds, and in two simple moves.

1. Lay a straight edge or a ruler from 47 on the denier line passing through *W* and read the answer 170 instantly on the equivalent counts line No. 2. See dotted line *D-D*.

2. Lay the ruler from 190 on the denier line passing through pivot point *C* and read the answer 28s on the equivalent counts line No. 2. See dotted line *E-E*.

Over one thousand different solutions can thus be obtained from this chart alone, without the least effort. However, let it not be thought for a moment that the construction and calibration of this chart can be accomplished without any effort. In order to render the chart practical and simple to the extreme a great deal of work and detail is required, and unless a chart is mathematically correct it will fail to serve its purpose.

To Find Weight of Rayon

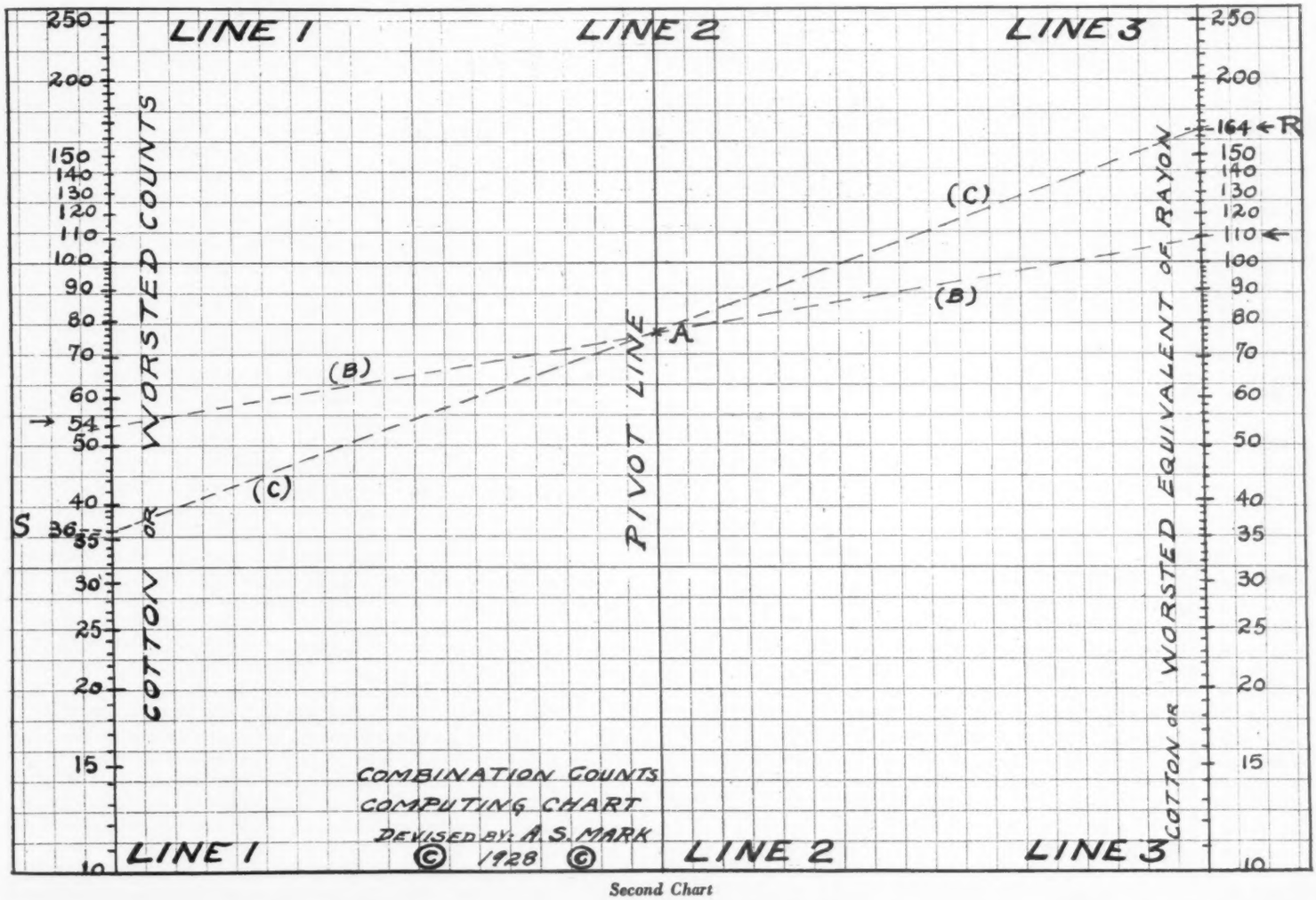
The usefulness of this chart, however, goes still further. Suppose we want to know how many pounds 550,000 yds. of 160-denier rayon will weigh. To find the weight of 550,000 yds. of 160-denier, we have to find first the yards per pound of 160-denier rayon, and this can be obtained instantly by laying a ruler between 160-denier and the pivot point *R*, and reading the answer, 28,000 yds./lb.

$$\frac{550}{28} = 19.6 \text{ lbs. is the answer.}$$

The chart is so flexible in results that the process can be reversed; and, if we want to know what denier rayon weighs say 120,000 yds./lb., we can immediately find from the chart the answer, 37-denier rayon. See dotted line *N–N*.

Combination Yarn

We often have to deal with combination yarns of rayon and worsted,



Second Chart

or cotton and rayon, and for such problems the second chart is of great value indeed.

Example: We want to twist 72-denier rayon with 1/54 worsted, and desire to find the counts of the combination yarn.

From the first chart the count of 72-denier rayon is found to be 110s worsted equivalent. On the second chart lay a ruler joining 54 on line No. 1 with 110 on line No. 3 (see dotted line *B–B*). Place a pencil point where this line cuts the vertical line No. 2 at point *A*; with *A* as a pivot, move the right-hand side of the ruler upwards until you reach (54 + 110) = 164, on line No. 3 (at point *R*). On the left-hand side on line No. 1 you will see the answer to the problem, 36s (at point *S* on dotted line *C–C*). Therefore, the counts of the combination of 72-denier rayon and 1/54s worsted is 36s.

By the long-hand method to obtain the same answer, 36s, one has to go through the following calculations:

$$\frac{4{,}464{,}528}{560 \times 72} \text{ and } \frac{54 \times 110}{(54 + 110)}$$

and, by the time you reach the end, you may get the answer 36, and then again, if you made a slight error, you may not.

Construction of the Chart

For the benefit of those technically inclined, I give below the logarithmic equations needed for the construction of the chart:

$$(\text{Log KR}) - [(\text{Log KW}) + (\text{Log D})]$$
$$[(\text{Log W}) + (\text{Log R})] - (\text{Log C})$$

Where KR is the rayon constant = 4,464,528
W is the worsted counts = 54
R is the rayon worsted equivalent = 110
KW is the worsted constant = 560
D is the rayon denier = 72
C is the sum of the counts = (54 + 110) = 164

These are the general forms of the equations representing the two charts. Their length, however, should not dissuade or discourage those interested. They can devise ways and means of designing charts in their own way, depending on the degree of technical knowledge they possess.

In the solution of problems involving the finding of the combination counts of cotton and rayon, we proceed in very much the same manner. There are two distinct operations to be performed. First, we must find the cotton equivalent of the rayon denier, and this is done by using the first chart; and, second, we must find the combination counts of the two counts by the use of the second chart. Those who have followed the solution of the examples given will have no difficulty whatsoever in solving examples involving cotton and rayon.

In the solution of complicated problems, it will be found very helpful indeed if the problem is broken up into its component parts, and each one of these is dealt with individually. In a like manner, the calculating chart should be designed and used to solve the problem step by step, and no one should expect the impossible from a logarithmic chart, despite the fact that even in its crudest form, it is far superior to many calculating devices.

There is no textile problem, I might say, that could not be solved once and for all by a properly designed logarithmic chart. This may seem a rather broad statement, and it is. Yet, it is true; and, in subsequent issues of TEXTILE WORLD, charts will appear covering practically every phase of the industry to substantiate this statement.

During the past five years, the writer has covered the field fairly completely, and those of the leaders in the textile industry to whom the charts have been privately shown, have expressed themselves very favorably indeed as to their merits and underlying possibilities. It is for this reason that the writer feels confident that eventually these will be universally used to supplant the antiquated method of long-hand calculation in the solution of many problems, and earnestly hopes that the day may not be in the remote future.

Methods of Identifying Rayons as to Group, Type, And Probable Manufacturer

Value of Complete Stock of Known Brands — Preparation of Samples

By Arthur K. Johnson

TO identify accurately and rapidly a given sample of rayon as to its group, type, and probable manufacturer, from any of the ever-increasing number of commercial brands is not necessarily an easy task. The problem may be complicated by a variety of factors in addition to the large number of brands.

(A) Need for Cautious Treatment and Interpretation of Tests

The various factors involved, while apparently not requiring excessive changes in methods of identification, do make it necessary to use extreme caution in the interpretation of results. Progress and diversification in the manufacture and treatment of rayons (whether taking place in the spinning solution, in the coagulating bath, in the reeling conditions, or after the completion of the original yarns) has brought the types (not groups) of rayons closer and closer together in their similarity of the physical and chemical properties used for testing.

These changes in process, made for the purpose of producing an improved and more pleasing product with respect to such properties as subdued luster, feel, softness, water resistance, covering power, weighting, sizing and dyeing properties, have caused a reasonably progressive change in the sizes (diameter), shapes, surface and internal conditions of the fibers and of the yarns, and of their chemical composition. The results is that physical facts and appearances used as a basis for identification (as cross-sectional appearances) must be continually altered and brought up to date, the lines of demarcation between types in chemical tests involving color changes have become less pronounced, and types are liable to give results which, by belonging to another type, lead to erroneous reports. A fine illustration of this latter case is seen in the nitration of viscose or cotton yarns, or the use of collodion coatings or sizings in finishing whereby a blue color is produced on treatment of the sample with diphenyl amine dissolved in sulphuric acid, which color is usually taken to be characteristic of nitro rayons.

Amount and Condition of Samples

In addition to these complications introduced by the large number of brands upon the market and by the great diversity and overlapping of modifications in process and treatment, there are numerous others of more local or individual significance. Not the least of these is the amount of fiber at hand available to be used in testing. Some excellent methods of testing are eliminated from use, in given cases, by the fact that they require more rayon than is available, or because they need special apparatus or chemicals which cannot be had. Again, the stage of processing in which the sample is found, ranging from rayon waste or yarn to made-up goods (garments or rugs), by limiting one to the amount and kind of treatment in identification, is not to be overlooked.

The condition of occurrence of the rayon is important—as to whether or not it occurs as pure or mixed rayon types in waste, yarns, spun threads, or pile; or as union material produced by carding the loose fibers together, by twisting or coreing pure plies of different fibers, or by looping two separate threads of different fibers into the same needle as in hosiery. In all of these cases it may be necessary to identify the kinds of fibers present and to separate the kinds for final identification.

The presence of foreign substances put upon the rayon in cloth or fabric finishing treatment may also give trouble and necessitate preliminary purification before analysis; substances for oiling, waxing, sizing, weighting, coloring, delustering, water resisting, tinsel covering, etc., are illustrative. The removal of many of these kinds of foreign materials is especially needed by the methods of testing which involve color changes. The presence in the literature of a large number of methods which are inadequately described for execution in testing, or which pro-

duce indefinite or difficultly interpretable results, or which are of little value for general use, leads to much confusion and discouragement often leaving one at a loss as to how to continue.

If, then, the rayon has not been given special treatments which modify its physical form or its chemical composition from that of the type sample; *if* the quantity of rayon available is reasonable in amount, in purity of kind, and in freedom from hindering foreign substances; *if* the proper apparatus and kinds of chemicals can be brought to hand; *if* reliable and tested methods of procedure and the knowledge of how to interpret what their results indicate are used; then, and only then, may it be a comparatively easy matter to identify any unknown kind of rayon in any condition of use, as to its main group affiliations, its type, and possibly its manufacturer.

(B) General Methods

It is the purpose of this paper to suggest, in addition to the frequent need for caution in interpretation, some tried and selected procedures for identifying rayons. It is highly recommended that one having frequent occasion to identify rayons endeavor to have at hand an up to date and complete stock of positive or known types and manufacturers' brands for comparison, in testing, with the unknown sample.

The general principles of the methods used to identify rayons may be classified under the following heads:

(1) PHYSICAL CHARACTERISTICS

(*a*) *Behavior with heat and during combustion.* This distinguishes animal from vegetable fibers, and acetate rayons from those known as regenerated celluloses. Its requirements are very simple in apparatus and quantity of rayon, and ordinarily there is little need for the removal of foreign substances. The points to observe are (1) the tendency to fuse with heat (animal or acetate fibers); (2) the rapidity of burning; (3) the "smell" of the white fumes arising immediately after the blowing out of the flame of burning fiber (detecting presence or absence of burnt-hair odor, characteristic of animal fiber but not of acetate silk—this silk has the fume-smell of smoldering cotton); and (4) the character of the ash or cold, burned end of the fibers (presence of swollen, congealed, hard knob, animal or acetate fiber).

(*b*) *Behavior with true solvents like acetone (USPX) or hot strong acetic acid.* This serves to distinguish unmodified acetate silks, which are gelatinized in the cold and dissolved more or less completely in the warm or boiling solvents. (Acetone, like gasolene, is dangerous to use near free flames; use steam, hot water or hot plates). Alkali-saponified acetate silks may be diminished in solubility in proportion to the degree of saponification, but usually show enough gelatinization to be recognizable. The same appears to be true of delustered acetate rayons. The quantity of rayon needed is very small, ¼ in. or more, and apparatus requirements are easily satisfied. The chemicals can be purchased at any drug store. The points to observe are the tendency to gelatinize and dissolve. In mixed rayons the presence of the dissolved acetate silks may be shown by pouring off the solvent and highly diluting it with water. The dissolved acetate precipitates out as a curdy white or translucent mass.

(*c*) *Cross-sectional appearances.* This test is of very considerable value in distinguishing types of rayons and the manufacturers of given brands. Each manufacturer's product even when using the same process, appears to possess microscopically revealed differences. To interpret these satisfactorily requires knowledge of the appearances of standard samples. In addition to noting shapes, sizes and their uniformity, it can be used to show internal condition of the fiber and the number of filaments and plies per thread (sized threads in particular).

In general it may be said that nitro rayons and acetate rayons are lobate in outline (that is, the outline shape is irregular but the irregularities are of more or less rounded ends). Viscose rayons possess a serrated edge (numerous irregularities with pointed ends like sawteeth); cuprammonium fibers are of nearly regular and smooth outline (Bemberg is nearly a perfect circle, others are bean or kidney shaped).

Rough sectioning methods require special apparatus like safety razor blades, hardening or embedding agents (paraffin, celloidin) or block holders. To study cross-sections requires a microscope with a possible magnifying power of about 50 or 100x. This may be an instrument ranging in cost from $10 to $100 or more. Depending upon the method of sectioning employed the quantity of rayon required may vary from ½ in. to several yards, and the time consumed may be from several hours to several minutes.

In pile fabrics it may be possible to insert the cut pile fiber through a pin hole in white paper and examine it directly.

(*d*) *Other physical properties* have been used for identification in special cases such as refractive index, moisture content of conditioned samples, behavior with an electroscope, etc.

(2) CHEMICAL PROPERTIES BASED UPON THE PRESENCE OF CHEMICAL GROUPS OR IMPURITIES LIKE SULPHUR OR COPPER, OR THE PECULIAR DYEING PROPERTIES WITH DYESTUFFS.

(*a*) *Nitro groups*—shown by reaction with diphenylamine in sulphuric acid. This shows (1) nitro, Chardonnet or collodion process of rayon manufacture; (2) nitration of cotton or other types of rayon, and (3) coatings with collodion, pyroxylin and similar nitrated products. The chemicals may be purchased at any drug store. (They are destructive to clothing and skin). The quantity of rayon necessary is very limited (¼-in. or more) and it should be of no color which will interfere with the appearance of the blue. If it has such color not discharged with sulphuric acid, bleach or strip it before testing. The things to note are the blue color imparted to the fiber and, when dissolved, to the cold solution. To detect nitration of viscose rayons examine the cross section and add this reagent, noting the extent of penetration of the blue in comparison to nitro rayons under similar conditions.

(*b*) *Tests for sulphur in viscose rayons.* (1) Silver sulphide formed by boiling the rayon in a solution containing silver nitrate, sodium thiosulphate and caustic soda (obtainable from drug stores). This solution is made up by dissolving 1 gram silver nitrate in 25 parts of water, and adding it to a solution of 4 grams of sodium thiosulphate in 25 (cc)

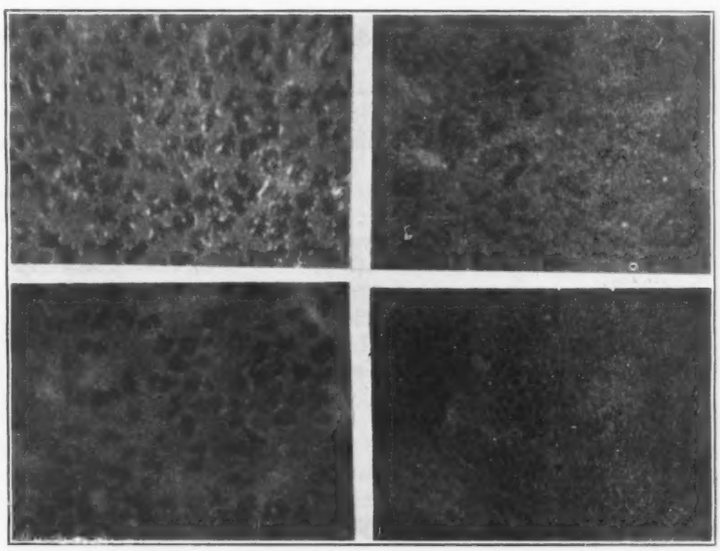


Fig. 1. Differences in Cross-Sectional Appearance and Size of Rayons. Upper Left, Viscose; Upper Right, Chatillon; Lower Left, Tubize; Lower Right, Bemberg

parts of water, stirring to a clear solution, then adding to this 4 grams of caustic soda in 25cc. of water. Mix thoroughly, filter if necessary, make up to 100 parts with water and store in amber colored bottles, or in the dark, for use.

The color after boiling one or two minutes is noted. Viscoses give a greenish brown or bronze. Many types of rayon which are questionable viscose, give a red chocolate brown. Some samples of known cuprammonium give a similar red brown. In spite of the fact that numerous published reports state that this reagent leaves cuprammonium unstained it has not been the author's experience that this is correct. Bemberg appears to come the nearest to it but even this is apparently stained not far differently to desulphurized viscose. Nitro rayon is also heavily stained but can be eliminated from consideration by the diphenylamine test. It also has a deeper, less bronzy color of brown. (2) Sulphur by the hydrogen sulfide process are proposed by Schreiber and Hamm. This test decomposes the sulphur compounds in viscose by means of sulphuric acid to form volatile hydrogen sulphide. This gas in escaping from the flask passes through filter paper moistened with lead acetate solution and interacts with the lead salt forming a brown or black deposit of lead sulphide. The test requires a considerable amount of rayon, which amount apparently may well be increased when testing desulphurized viscoses. It also takes considerable time (4 hours or more) and requires a little apparatus not liable to be at hand outside of a laboratory. It

apparently is a method of considerable certainty when properly carried out.

(c) *Tests for copper in cuprammonium rayon.* This test has been advocated as being at times serviceable for proving the presence of cuprammonium silk. The rayon is charred, the char extracted with dilute nitric acid, filtered, the acid neutralized with ammonium acetate, and the copper precipitated as a red color or red sediment by potassium ferro cyanide. It is a complicated test, hard to apply outside of a laboratory, and perhaps not sensitive enough to apply very frequently.

(d) *Differential coloring with dyestuffs.* At times, by careful comparison with standard rayon samples treated under identical conditions with the unknown samples, suggestions as to type may be obtained by the use of properly selected dyestuffs. Quantities of dyestuff, and conditions of their application to give a mere staining reaction, rather than a deep dyeing, apparently furnish the better results. But at best these differential color reactions appear susceptible to erroneous conclusions and are of doubtful value. Picro-carminic acid in ammonia solution, carminic acid alone in ammonia, Pontamine Scarlet B, Sulphur Scarlet B, Sulphur Khaki, Naphthylamine Black 4B, etc., have been suggested as possible dyes.

(C) Systematic Examination of an Unknown Sample

Animal or Vegetable Fiber. Red color with Millon's reagent—animal fiber present.

(1) Treat the sample with warm (not boiling) Millon's reagent for a few minutes. Observe the development of a brick red color with animal fiber, other fibers remaining not red. If the dyestuff on the fiber is not sufficiently discharged by the warm reagent to allow this change to show, strip the color on a new swatch by bleaching with sodium hypochlorite or by reducing with hydrosulphite stripping agents, wash and repeat staining. Millon's reagent is prepared by dissolving a known weight of metallic mercury in its own weight of concentrated nitric acid at slightly warm temperature, then diluting the solution with an equal volume of water. Test the activity of the solution to animal fiber by touching a bit to the finger or to animal fiber. If the treated skin or fiber turns red in a short time the reagent is satisfactory. It should be kept protected from the air in tightly stoppered glass bottles bearing a "poison" label.

When testing rayons it is well to be very careful not to get this nitrating reagent onto the rayons from the fingers. The reagents gotten onto the fingers by handling the bottle or the reagent may easily be transferred to fibers and these then give a temporary blue color when treated with diphenylamine in sulphuric acid as though they were nitro rayons.

(2) Burning test with a match flame. Tendency to melt with the heat, slow rate of burning, and fumes possessing burned hair odor—animal fiber. Twist the fibers into a tight wad and carefully approach them toward a match flame. If they melt they may be animal fiber or acetate rayon. Ignite the fibers, observe the amount of flame and rapidity of burning them, blow the flame out and smell of the white fumes. If the smell is that of burned cotton, and the fibers have a hard globule of ash on the end after cooling, they are acetate rayon. If the odor is a burned-hair one they are animal fiber or a mixture.

Acetate vs. Regenerated Rayon (Viscose, Nitro, Cuprammonium)

(1) Burning test—fusion and hardened ash, burning slowly with little flame, burned cotton fume. Acetate rayon. Quantity ½ in.

(2) Dry heat. Heat in a dry container or with a sufficiently hot iron. If it melts it is acetate rayon. Quantity ¼ in.

(3) Soluble or gelatinizes in cold acetone; soluble in hot, strong acetic acid. Acetate rayon. Quantity ¼ in.

Caution is needed with alkali-boiled acetate and possibly with delustered, if completely done. Tendency to gelatinize and lose thread form present.

(4) General slimy disintegration and loss of thread form with hot 10–15% caustic soda—acetate rayon. Nitro rayon is liable to go brittle on handling during this boil and break into short lengths. The soda solution may be tested for acetate if necessary.

(5) Cross-sectional appearances, compared with those of standard yarns. Irregular outline usually lobate, medium size, fairly uniform.

Preparation of Sections

Two general methods are available for rapid preparation of sections; one involves the use of a metal block support for the fibers and the second involves the use of paraffin according to the method advocated by E. R. Schwarz of Massachusetts Institute of Technology.

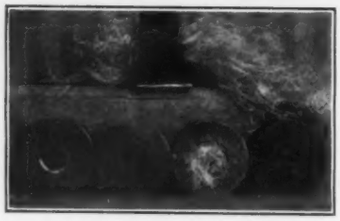


Fig. 2. Metal Fiber Holders. At Left, Empty Pair, Back and Front; at Right, Filled Pair, Back and Front; at Top, Filled Holder Ready for Cutting

The block method consists in using a special, conically-bored block of iron or brass about 1 in. in diameter and ¾ in. thick, flat top and bottom. In the top is a hole measuring about ⅛ in. in diameter which is square shouldered with the top surface, and which penetrates to about ⅛ in. below the surface. From here downward the ⅛ in. hole rapidly expands, conically, to occupy about ¾ in. of the area of the bottom.

To prepare for the block for sectioning use dry white or decolorized, parallel threads of rayon. Twist the fibers into a long-tapered conical wad, having a lead thread at the top and being large enough at the bottom to prevent passage, after compression, through the ⅛ in. hole at the top of the block. Insert the lead thread of the prepared wad of fibers through the hole in the bottom of the block, out through the top. Then pull the fibers as firmly as possible into this conical hole, using square-pointed pliers to grasp the lead thread and to pull with. The trick is to get a firmly compressed solid core of fibers in the ⅛ in. short tube near the top. The firmer this core the better is the section—surface to be obtained later. The firmness prevents the threads from bending when the razor blade passes through the bunch of fibers.

To cut the section, obtain new safety razor blades with protected back edge, such as Gem blades; hold the prepared block firmly in the fingers, but be careful to keep the ends of the fingers well below the top surface of the block. Then, holding the blade nearly parallel with the top and in contact with one edge of the bundle of fibers, right at the metal surface, draw the blade through the fibers along the metal surface with a single quick draw stroke. This should give a good square-cut surface of fiber ends at the level of the top of the block. Second strokes on the same core of thread are not very valuable for the preparation of the sections. Two or three draws, in different parts of the same blade, usually end the blade's serviceability.

To observe the cross-sections place the block on the stage of a microscope; light by having good daylight, or the light from an artificial illuminant, like a Silvermann illuminator (cost about $50) play on the top surface of the block and focus on the fiber ends. With ordinary forms of a compound microscope sufficient magnification may be obtained by using a 16mm. objective and a 10 or 20x eyepiece (about 100–200). The maximum of service will be had with an 8mm. (or 21x) objective and the same eyepieces. As a rule exceptionally good cross-sectional appearances will be obtained suitable for visual study and for photographing through an attachable photomicrographic outfit like the Lucas or B & L K-100 model. Naturally one need not expect to have all fiber ends in exactly the same plane of focus for either visual study or photography.

The advantages of this method are extreme speed, section made in 1 to 2 minutes, fibers unchanged in appearance, physically or chemically. The method is not suitable for a tiny quantity of rayon nor for cream colored or darker colored yarns. Oil-free fibers usually act the better.

Sectioning by Paraffin

The rapid method for sectioning by paraffin involves the following steps: Coat yarn with binder, like collodion solution USPX, by immersion into it for a few seconds under tension on a spring wire, then hanging to dry to a reasonable hardness in warm dry air. (Avoid excessively hard drying). When dry immerse for 2 or 3 minutes in paraffin wax held at a temperature of 1 or 2° F. above its melting point. Then pull yarn out and plunge into ice water for a few seconds. Remove, shake off water and repeat. By rapid alternate dips into the paraffin, followed by the ice water, a supporting block of paraffin can rapidly be built up around the fiber. When this is ¼ in. or larger its ends may be cut square at right angles to the congaxis of the thread and cut into convenient lengths, as ½ in. One end of the portion of the block is fastened to a wooden rod of convenient length, by gentle melting and pressing onto the end of the rod, followed by cooling in ice water. When cool cut sections as thinly as possible with a safety razor blade. Mount on a glass slide and warm very gently so as to soften wax and allow it to flatten onto glass. The section may then be examined through any microscope.

Advantages of this method over the first is the possibility of using

any fiber in any color or condition. the possibility of using light coming up through the section instead of only that coming from the top, the ability to use chemical reagents for additional testing, the ease of making filament count in a single yarn and noting the ply structure, and distribution of ply about yarn axis.

In studying the sections note the general shapes and the irregularity or smoothness of their outline, the uniformity in sizes of sections. With sized yarn by either method, filament count is easily done. The identification of the manufacturer is best done by comparing section of unknown with the known samples. Sections of standards may readily be prepared by either method of sectioning and kept on file.

Regenerated Celluloses

Having eliminated animal fibers and acetate rayons from consideration by getting negative results to the above tests the next step is nitro or collodion rayons.

(A) NITRO OR COLLODION RAYONS

(1) Blue color with diphenylamine in strong sulphuric acid (1 part by weight to 100 parts of acid). Moisten thread with water, squeeze out excess and drop the fiber into a small quantity of the cold reagent. An immediate blue color and soon a blue solution suggests nitro rayon or a nitrated rayon. If necessary, make section of yarn as by paraffin method. If section looks like viscose section, add this reagent to the section. The blue color often shows deepest in the outer edge of section and may fall off in intensity toward the center, when fiber is nitrated viscose. Nitro rayon section shows blue all over. The film of wax tends to reduce the speed of solution of the fiber sufficiently for examination.

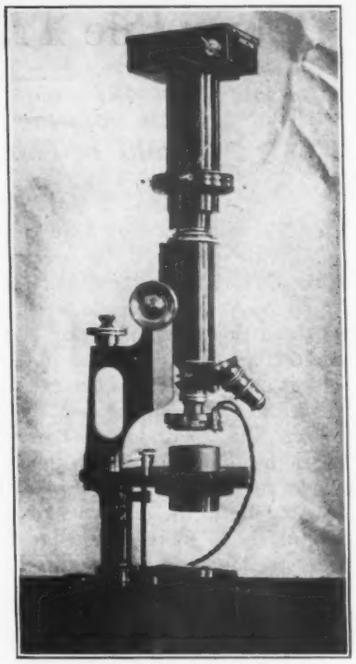


Fig. 3. Cross-Sectioning Block Set on Microscope Lighted with Silvermann Illuminator and Equipped with Lucas Photomicrographic Camera. This complete outfit is useful on account of speed, accuracy, and convenience in identifying and photographing

(2) If needed, study the cross section against a standard. It is practically impossible to give an adequate written description which will suffice to serve for one who has never seen the appearance for himself. It is relatively easy to obtain standard samples which when used are much more satisfactory.

(3) Nitro rayon is more highly reactive with the silver sodium thiosulphate-caustic soda reagent than viscose rayon and gives a deeper, less bronzy brown.

(B) VISCOSE RAYON VS. CUPRAMMONIUM

(1) With the acetate group of rayons eliminated practically by negative results in the burning test and in the solubility test in acetone acid, and with the nitro type taken care of by the diphenylamine reaction, there remains only viscose and cuprammonium types.

One of the best methods to distinguish these two rayons appears to be the cross section appearances. In general, viscose rayons of different manufacturers have a great variety of shapes or sizes among themselves (which may be used for identifying both type and manufacturer, in comparison with standards), but they nearly, if not quite all, possess sharp pointed irregularities on the outline or circumference of the section. Cuprammonium rayons also seem to have a variety of shapes but in general are of a more regular or smooth outline.

It is a necessary precaution to keep the standards used for comparison of sections absolutely up to date both as to shipment of a given manufacturer's product and of his new types or varieties of rayon, because cross sectional shapes are liable to change with variation in process.

(2) For detailed identification of viscose the liberation of hydrogen sulfide by heating 5 or more grams of the sample in 100cc. of water and 3cc. of pure sulphuric acid, contained in an Erlenmeyer flask. The top of the flask is covered with filter paper moistened with lead acetate solution. The flask is heated for 4 hours in a water bath during which time the hydrogen sulfide liberated reacts with the lead salt to form a brown or black satin. Cuprammonium rayons give negative results, i. e., no stain.

With desulphured viscose rayons the test may be somewhat less pronounced than with the ordinary type.

(3) The coloration produced by the Ag reagent may be of some value. When nitro silk is accounted for, viscose rayons may be recognized by the bronzy brown color. Samples showing little color or red brown are hard to classify; they may be cuprammonium or viscose.

(4) Numerous dyestuffs have been suggested for service in identifying these rayons, but confidence in them is not very high. Comparisons with known standards is usually essential, but the principle of the test does not appear to be of general value because of lack of sharpness in distinction and liability for variations in results by different operators.

One of the encouraging things for the beginners in rayon identification is knowledge of the fact that the initial unbounded confidence of those who are experienced in it, is so often shattered by the persistence with which samples show up which do not conform to normal results of tests, and the expert finds himself up a tree for thought. The accurate identification of a rayon is not necessarily an easy task.

Dyeing and Finishing Knit Goods

Preparation of the Cloth — Dyeing and Drying Temperatures — Calendering

It may be interesting to a good many dyers of rayon knit goods to read this article and see how their methods of processing rayon fabrics compare with this writer's. The knitting of rayon has reached out until it embraces a vast number of fabrics. A few years ago one did not realize that rayon would be worn by men in the form of underwear. It is with us today in such products, and is gaining in popularity more and more as time goes on.

The manufacturers of rayon have brought their products to such a stage of perfection that the knitters are now able to turn out goods without encountering many of the troubles that existed not so long ago. In order for many fabrics to be salable they must be dyed and finished successfully. No matter how good the yarn is, or how well it has been knitted up into the fabric, the dyeing and finishing are responsible, in the final analysis, for the sale of the goods. Nobody wants a poorly dyed or slovenly finished garment. The customer today is being educated in buying textiles, and if the quality isn't there no powers of salesmanship can put the sales across the counter.

It behooves the dyer to keep in mind that his aim is to put his best efforts and ability in turning out the best possible fabric with as little trouble as possible. The fabric which the dyer receives today is much easier to scour than that which came into his department a few years ago. Objectionable oils are used less and less. They are rapidly being replaced by other conditioning oils which are readily removed.

Scour Before Storing

For those who still must contend with the scouring of fabrics which have been treated with neatsfoot oil, it is well to keep in mind that the goods should not be left lying around or stored for any length of time. Such practices are exceedingly detrimental to the knitted rayon, for oxidation of neatsfoot oil commences within a very short period. Once this has taken place it is almost impossible to dye the material evenly.

If it is necessary to store the goods, due to lack of dyeing orders, the goods should be given a preliminary scouring. The goods can be scoured by the use of a good heavy soap, made up with 7 oz. of soap and 4 oz. of soda ash to the gallon. To prepare the soap, an iron or wooden tank can be used, connected up with a perforated steam pipe. If a 500-gal. tank is used, fill it one-quarter full of water and weigh in 210 lbs. of palm olive fulling soap and 125 lbs. of soda ash. Bring this to the boil and boil it for three hours. At the end of this time run in the water slowly and fill up, leaving the steam on. It is ready to use as soon as it has cooled sufficiently for safe handling. For a lot of goods weighing 120 or 130 lbs., four or five parts of soap will produce a good soap bath. The pieces are run into the kettle and the water is brought up to the proper height, generally two-thirds from the top. The soap is then added, the steam turned on and brought right up to the boil for 30 min. All of the neatsfoot oil is not removed at this time,

but enough is taken out to prevent any further injury to the material. Two scourings are necessary and even under these conditions there is the chance of a trace of oil being left in the goods.

In washing off, hot water should be used. The kettle is kept running and allowed to overflow through outlets on the sides. The oil rises to the top and is carried off through the outlets. Any scum adhering to the sides must be cleaned off, otherwise it will produce stains. It will take 30 to 40 min. for the water to clear. After this, cold water can be used for cooling the goods. If the goods are to be colored, this scouring operation is repeated. This second scouring will still bring out considerable oil.

With the exception of neatsfoot oil, practically all of the conditioning oils are easily removed from the goods. Some can readily be removed by running the goods in warm water. A general method, which it is safe to adhere to, is to use two per cent of any good neutral soap and one per cent of sodium triphosphate. Scour at 160° F. for 15 to 20 min., and rinse off. The soap will leave the goods soft and lofty and will give them a nice handle.

Dyeing Knit Fabrics

One should not experience much difficulty in dyeing rayon knit fabrics after they have been properly prepared. The dyeing of rayon fabrics for undergarments is generally done with direct colors. The shades are mostly light shades, flesh and peach predominating. Care should be used in selecting colors which will dye at the same temperature and exhaust equally well. For light shades, the dyeing temperature is generally 120° F. The dyestuff is dissolved separately and strained, then added to the dye kettle and the goods are run for 10 min. at 80° F., and perhaps 5% of glaubersalt is added if necessary. The temperature is then brought up to 120° F. for 15 min., and the goods are sampled for shade. If a good formula has been established, the goods are generally on shade the first time.

For dark shades, the dyeing is carried out similar to the dyeing of light shades, but the glaubersalt is increased to 15 to 30%, depending on the depth of shade. The temperature is raised to 160 to 170° F. Prolonging the dyeing has a tendency to impair the fabric, therefore it is expedient that the shade be matched within a reasonable time.

Difficulties That Arise in Dyeing

The difficulties that arise in dyeing are chiefly some form of uneveness. The dyer in most cases is responsible for this trouble. Due care should be exercised in feeding on colors, because this point is where one is liable to experience trouble. Without the proper knowledge of the properties of the dyestuffs, it is a very easy matter to produce uneven work. Dyestuffs have a great affinity for rayon at different temperatures and it is well for the dyer to learn just how his colors behave at the various temperatures.

It can readily be seen that if a color which exhausts at 120° F. is fed on to a shade at a higher temperature in a dyebath containing glaubersalt, this color is going to go on rather rapidly and consequently unevenly. If the situation is such that an addition has to be put on, it is safe policy to reduce the temperature of the bath and run off some of the dye liquor to get rid of the salt.

Before taking the goods out of the dyebath, make sure the trucks are clean. The goods are extracted and should be examined for stains before dyeing. Stains are easily removed while the goods are wet, but this is rather difficult after they are dried.

Drying and Finishing

In drying, the temperature should be maintained around 90 to 100° F. By drying at this temperature the goods will be very soft and lofty. Too much heat has a tendency to make the cloth harsh and raspy. After drying, the goods are run over the calender and given a good steaming to improve the finish. The calender rolls should be far enough away from the steam jets so that they will not heat up too much. It is best to run the cloth through the calender with the rolls just warm from the heat obtained from the steam. The cooler the cloth is treated after dyeing, the better the finish will be in every respect.

If one desires a very soft finish, one of the best agents that can be used to obtain this finish is olive oil fig soap. This is a standard soap and one can never go wrong in using it. After dyeing, drop half the dyebath, fill up with water, and add one-half of one per cent of soap, previously dissolved. Run the goods for a few minutes and remove them from the soap bath. This method will produce a finish which is very difficult to obtain with anything else. The cost is not prohibitive; in fact, it is cheaper in the long run.

Rayon-Pile Transparent Velvet

Cause of the Streakiness That Results in Loss to Manufacturers

By James Chittick

MANY manufacturers have been sorely troubled, and much loss has been experienced, by streakiness in rayon-pile transparent velvets. In these fabrications the foundation warp is usually of a fine-sized, two-ply cotton yarn. The pile warp will be made of rayon and the filling will be a fine-sized silk yarn, such as two-thread organzine, or three-thread crepe twist. The reason that some manufacturers favor the crepe twist is not because it is desired to give a crepey character to the fabric, but because the roughness of the yarn will counteract any tendency to slippage. It is fair to say, however, that with a reasonable pickage in the cloth a fabric woven with an organzine filling and with a proper amount of warp should not give any trouble from slipping.

According to the regularity of the yarn used for warp, there may be, and usually is, more or less streakage warpwise, but the main trouble from streakiness is in the crosswise direction. This in many fabrics is very accentuated, the peculiar nature of the finished material stressing this feature in a way that would not by any means be so apparent on heavier kinds of pile-fabric structures.

Major Cause of Defect

The major cause of this aspect is to be found in variations in the size of the yarn employed in the filling. When a typical damage of the kind referred to is inspected, it will be noted that where the material shows light-colored cross streaks, the pile will be shorter, and, in the darker streaks, the pile will be longer. If such a cloth is laid out on a table under a little stretch, and the face is dampened and brushed with a sponge lengthwise, this difference in the height of the pile and consequent thickness of the cloth across the piece in the varying dark and light streaks is quite observable.

In such goods the pile warp is fed off by mechanical means in such a way that practically an exact length of pile warp is furnished for each pick, and therefore it might be objected that, as the length of pile for all picks is the same and the goods are cut uniformly in the same manner, all the pile would be of the same height. When a cloth showing such irregularities of height of pile is put on the shear and sheared to an absolute uniformity of height of pile, this cross streakiness will still persist.

The explanation of this appearance is to be found in the following fact: When the pile warp interlaces with a relatively thick pick the spread of the projecting pile ends is greater, and with a thin pick it is less. That is, the pile, when cut, assumes in effect a shape approximately like the letter U, so with the thicker filling the upright portions of the U are further apart than with the thinner filling. When the weaving takes place there is a greater stretch, or strain, put upon the pile warp when it is passing around the thicker filling threads than when it passes around the thinner filling threads, and although the distance apart of the two cloths in the loom and the length of pile extending between them will be practically the same when the cutting takes place, yet those pile threads which are under this heavier strain will promptly contract in length as compared with the pile ends that pass around the thinner threads. Thus this variation in height comes into being.

Light and Dark Effects

In addition to this difference in height, there is the fact that the longer pile, owing to its greater absorption of light, will take on a darker aspect than the shorter pile, and where the tufts of pile are spread further apart, and the density is correspondingly less, a lighter aspect will be given to that part of the fabric. This is the reason why, when such a cloth has been sheared to a uniform finished height of pile, this cross streakiness of light and dark bands will continue.

If at a portion of the fabric where such variations occur the pile should all be carefully picked out from, say, a square inch or so of surface, the foundation cloth will usually appear quite regular to the eye. If at such a place, also, where the pile has been removed, the warp threads were cut crossways, say for an inch at one end of the picked-out place, and also at the other end, and the warp threads were carefully drawn out so as to leave nothing but the foundation filling threads in

that area, and the size of the filling yarn was carefully inspected, little or no variation in size would be apparent to the eye.

A determination as to the variation in size of the filling thread can only be made accurately by selecting a place in the cloth where a dark cross stripe sharply abuts on a light cross stripe. If the cloth is then carefully cut across at the junction of these two darker and lighter places, and as many threads as possible, whether they be half a dozen or a dozen or more, are carefully removed from the cloth, and are weighted, it will invariably be found that the filling at the lighter places weighs substantially more, and is therefore correspondingly thicker than the filling at the darker places. Such variations in size might not be very great from a commercially considered standpoint; that is, there might only be differences of say 10 to 20% in a yarn that was fairly regular, and which under ordinary circumstances would give little or no trouble.

With the fine closely sheared structure of these transparent velvets, however, relatively small differences in the size of the yarn may cause great variation in the aspect of the finished goods. Therefore, whether a manufacturer is using a crepe twist or an organzine or a cotton yarn for his filling, it is vitally important that every effort be made to secure a filling material that will have the absolute minimum of variation in size. Otherwise, he will invite serious loss from the large percentage of seconds that will be produced.

Modern Methods and Trends in Processing Cotton-Rayon Woven Fabrics

Desizing, Scouring, Bleaching, Dyeing, and Finishing Cotton Piece-Goods with Rayon Effects

By Winn W. Chase

WITH the increased use of cotton-rayon piece goods, the bleaching, dyeing, and finishing of these fabrics has assumed greater importance. In the present article it is proposed, therefore, to outline the modern practice in processing cotton-rayon woven fabrics.

Four types of rayon are in common use, and one or more of these may be found in conjunction with cotton. The so-called regenerated cellulose rayons; namely, viscose, nitrocellulose, and cuprammonium, are somewhat similar to each other in physical and chemical properties, but each variety differs from the others in its affinity for the various classes of dyestuffs. Celanese, a cellulose acetate rayon, has entirely different characteristics from the other types. Preliminary to any treatment of the fabric, a knowledge of what particular rayon is present is necessary, therefore, if satisfactory results are to be obtained.

It is recognized that the tensile strength of rayon, especially when wet, is much less than that of cotton, and it is important to avoid rough handling and any great amount of tension in processing goods containing this fiber. Following this idea, the modern trend is to carry out a sequence of operations in the same apparatus without intermediate drying.

Celanese is saponified by alkalies, losing in weight, strength, and luster; so far as possible excess alkalinity should be avoided in baths for its treatment, although the maintenance of low temperatures or the addition of protective colloids to the liquor will minimize the action of the alkali. High temperatures in drying will damage celanese and extreme heat in the wet state will cause it to lose luster. It is said that the resistance to delustering by hot baths is increased by the addition to the bath of such inorganic salts as magnesium sulphate or ammonium sulphate; a more certain method is to keep the temperature of all solutions below 180°F.

Desizing Goods

While it is possible to obtain a good bleach without first desizing, it will be found that if rayon-effect goods are given a preliminary treatment with a diastase compound, the dyeing will be more uniform and the finished goods softer in feel. Whenever a soft finish is desired, it is recommended that the goods be thoroughly desized with diastafor, degomma, rapidase, polyzime, or some other suitable compound. Desizing may be carried out on the jig or in the slack washer, or the goods may be impregnated with the diastase solution on a mangle and afterwards washed on the jig or slack washer. The amount of diastase required will vary according to the strength of the product, the construction of the goods, and the degree of sizing, but 5 pounds to 100 gallons will usually prove sufficient.

The most efficient temperature for desizing varies with the different products and, as lower or higher temperatures retard or prevent the action, the proper temperature to be maintained should be ascertained from the manufacturer of the particular diastase which is used. When the starch and dextrine has been rendered soluble (usually 30 to 60 minutes) the fabric should be thoroughly washed with hot water.

Scouring Operations

Cotton fabrics containing rayon effects are sometimes boiled in the kier, but more frequently are scoured in slack washers, ordinary jigs, or specially designed scouring machines. An efficient scouring bath for fabrics containing viscose or other regenerated cellulose consists of 5 pounds Turkey red oil, 5 pounds olive oil chip soap, and 1 pound of soda ash to each 100 gallons of water. The temperature of the bath is maintained at 180° to 210°F. and the cloth scoured for 1 to 2 hours. After scouring the goods are rinsed well with hot water and, if a chemic bleach is to be employed, then with cold water. Monopole soap is sometimes substituted for Turkey red oil in scouring and trisodium phosphate used in place of soda ash.

In treating fabrics which contain celanese the temperature of the bath should not exceed 175°F., and a neutral soap should be employed; soda ash or other strong alkalies should be omitted from the liquor. Small amounts of ammonia or Celascour may be employed without diminishing the luster. Soft water is essential, as with hard water insoluble soaps of lime or magnesium will be formed which will cling to the fabrics; these impurities are difficult to remove and are liable to reduce the luster of the rayon and cause uneven dyeing of the goods.

Bleaching Processes

When the fabric is to be dyed in dark or medium shades bleaching is seldom required, but for the production of whites and light or brilliant shades it is necessary to bleach the goods. As a rule the same apparatus used for scouring may be utilized for bleaching. The chemic method of bleaching is usually employed, although the peroxide method is sometimes favored, and the permanganate bleach has some adherents. When the chemic process is employed it is recommended to use soda chemic (sodium hypochlorite) rather than lime chemic (calcium hypochlorite). Some bleachers, however, report that they are using the latter product with good results and that they find the lime chemic somewhat more active than the other.

Fabrics containing viscose, nitrocellulose, and cuprammonium rayons are treated for 1 to 2 hours at 65 to 70° F., in sodium hypochlorite at 2 to 3° Tw., then washed, soured, washed, antichlored with sodium bisulphite, and again washed. When celanese is present the chemic should be neutralized or made slightly acid with acetic acid before using. A strength of one-quarter degree Tw. is recommended, but when necessary to produce a good bleach considerably stronger solutions may be used.

When the peroxide bleach is employed the fabric after scouring is treated at 175 to 185° F. for 2 to 6 hours with hydrogen peroxide diluted to a strength of about 2 volumes and made slightly alkaline with sodium silicate. After the bleaching is completed the goods are rinsed well with warm water. In the case of celanese, ammonia is used for neutralizing the peroxide and the temperature kept below 175° F. Sodium hypochlorite is not recommended for bleaching fabrics containing tubize (nitrocellulose), but may be used if carefully controlled; it is directed in bleaching with peroxide not to exceed a temperature of 150° F.

It is stated that on tubize the permanganate method of bleaching, if handled correctly, gives satisfactory results with no weakening of the fiber. One bleacher using permanganate on other types of rayon

says that he gets a half bleached fabric, suitable for dyeing light shades, at less cost and without detrimental effect. For 100 pounds of goods a bath is prepared containing about ½ pound of potassium permanganate and ½ pint of sulphuric acid; the goods are worked in this solution for 15 minutes at 110° F., rinsed in water, treated for another 15 minutes in a bath containing ½ pound of sodium bisulphite and ½ pint of sulphuric acid, and again washed. The chief drawback to the permanganate method is the difficulty of controlling the rate of decomposition of the permanganate, as too rapid decomposition will cause tendering of the fabric.

Dyeing Fabrics

The direct colors are used to a large extent in dyeing fabrics containing regenerated cellulose rayon, but when necessary the developed basic, naphthol, sulphur, and vat colors may be employed. Considerable research has been conducted both by the manufacturers and users of dyestuffs on the application of the various classes of dyestuffs to rayon, and while more study is necessary there are some principles which have been fairly well established. It is quite generally known, for example, that nitrocellulose rayon has less affinity for substantive colors and more affinity for basic colors than has viscose, while the cuprammonium rayon has a greater affinity for the substantive dyes and less for the basic colors than has either of the other two types. Celanese, on the other hand, has little affinity for most of the direct colors and while it may be dyed with the basics, a few acid colors, and some of the chrome colors, the narrow range of shades obtained and the unsatisfactory fastness qualities of the dyed fabric leave much to be desired. For those reasons special dyes for cellulose acetate have been developed and these are used almost exclusively.

Perhaps the best known of these dispersion dyes, as they are called, are the S.R.A. colors. These dyes are made from some of the same bases as the vat colors, and the shades produced on celanese are as fast to light and washing as those produced on cotton by some of the vat colors. The dispersion colors dye celanese direct and need no addition of salt or acid to the bath.

Courtaulds, Ltd., have published the results of their research on the determination of the suitability of direct cotton dyestuffs for the dyeing of viscose. Their tests showed remarkable differences in the affinity for viscose possessed by the various direct dyes; some colors show the maximum affinity at 68° F., becoming less as the temperature is raised; other dyestuffs show the minimum affinity at 68° F., becoming greater to a maximum at 194° F.; and still other dyes show a maximum at 122 to 140° F. with the affinity decreasing at both higher and lower temperatures. More important, it was proved that those dyestuffs which show a maximum affinity for viscose at 68° F., give the most even dyeings in large scale production on commercial viscose; while dyestuffs with a maximum affinity at 194° F. give the most uneven results. It was brought out that in choosing colors for compound shades it is important to select dyestuffs which go on the fiber at the same rate and temperature. These conclusions do not mean, however, that the colors possessing the greatest affinity at 68° F. must necessarily be applied at this temperature. This test, which is called the "temperature range test," supercedes the capillary test formerly used to determine the suitability of direct dyes for viscose.

Dyeing Equipment

According to the construction of the fabric and the class of dyestuff to be employed, cotton-rayon goods may be dyed on the padder, jig, continuous, or reel machine. Recent improvements in machinery for dyeing includes all-metal becks and jigs of monel metal construction, equipped with ball bearings and a new type positive control clutch.

Direct colors are usually applied to goods of firm weave on the padder or jig according to the shade required, while light or fragile fabrics are dyed in the reel machine. Cotton-viscose fabrics are dyed with basic colors in the usual manner after first mordanting; Katanol is preferred for mordanting as it eliminates the harsh feel imparted to rayon by tannic acid and antimony salts. The basic colors produce light and medium shades on tubize without mordanting. Cellulose acetate rayon, according to D.R.P. No. 444,961, may be dyed with basic colors with the addition of not more than 5 pounds of a sulphocyanide to 100 gallons of liquor to produce shades fast to rubbing.

The use of formic acid to replace acetic or sulphuric acid in dyeing cotton-rayon fabrics with basic colors has been proposed. It is asserted that 2% of formic acid will do the same amount of dyeing as 10 to 25% of acetic acid, give better exhaustion of the color, promote more level dyeing, and eliminate the vinegary odor sometimes noticed on finished fabrics dyed with the addition of acetic acid; it is also said that while not as deleterious to the fiber, formic acid will produce dyeing as fast as those obtained with sulphuric acid.

Fabrics containing celanese are often cross-dyed in contrasting shades by dyeing the cellulose acetate with dispersion colors and the cotton with direct, developed, sulphur, or vat colors. Two recent developments of note in cross-dyeing are, first, the addition of a protective colloid such as glue, gelatine, or Protectol to baths containing sulphur dyestuffs to protect the celanese from the saponifying action of the sodium sulphide; and secondly, the production of two-tone effects with the same degree of luster by cross-dyeing celanese-cotton fabrics in which the celanese has first been delustered by treatment with aqueous solutions at temperatures over 185° F.

Drying Treatment

In fabrics containing rayon, and particularly celanese, crease marks are liable to result from squeezing or mangling. Mangling, therefore, is not recommended and, except in the case of crepes, cotton-rayon mixtures are preferably extracted at full width. Two types of machines for this purpose are now on the market; one of these, the horizontal roll piece goods extractor, is designed to take the rolls of cloth as they come from the jig or padder; the other, a vacuum extractor, subjects the cloth to a uniform moisture-removing suction at full width.

Low temperatures and the proper control of humidity are necessary if the best results are to be obtained in drying cotton-rayon fabrics. High temperatures may cause harshness of the rayon and with celanese brittleness, delustering, or glazing. While it is possible to dry some constructions of cloth with rayon effects on ordinary revolving dry cans, this procedure is not entirely satisfactory. Drying on the tenter frame is sometimes resorted to, but some prefer to use cell dryers heated with steam coils, or a circulating current of warm air, and equipped with automatic temperature and humidity controls.

Finishing Trends

In finishing cotton-rayon fabrics there are two distinct trends. In one case preservation of the luster of the rayon and softness of the fabric are desired, and in the other it is aimed to get away from the natural high gloss of rayon and produce a more subdued luster nearer to that of real silk.

When preservation of the luster is required it is imperative in finishing to avoid the use of large amounts of starches or oils which are liable to coat the rayon effect thus diminishing the luster of the fiber. In place of these products transparent materials such as gelatine, gum tragasol, Irish moss, and glycerine may be employed. When oils or emulsions are needed to obtain a soft finish, neatsfoot oil or olive oil softener are often used.

Delustering Rayon

Four methods of delustering rayon described by Mullin and Stribling are:

(1) In the manufacture of rayon by the addition of suitable material to the spinning solution or to the precipitating bath.

(2) On finished goods by the formation of insoluble precipitates on or in the fiber.

(3) On finished goods by altering the surface of the fiber by means of sizing materials or by mechanical processes.

(4) Special processes (heat or alkali) on celanese.

For treating cotton fabrics containing regenerated cellulose rayon to produce a delustered or souple finish the following methods have been proposed: The first method consists of precipitating aluminum salts on the fiber by saturating the goods with a 2% solution of aluminum sulphate and then passing them without rinsing into a 1% solution of olive oil soap at 140°F. In place of aluminum salts, barium sulphate may be precipitated by passing the material through a 2% solution of either sulphuric acid or glauber salt and then, without rinsing, treat for 20 to 30 minutes at 150°F. in a 3 to 5% solution of barium chloride. Another method recommended is the regular tin-phosphate-silicate weighting process used for real silk; it is said that rayon treated by this method is weighted to a somewhat greater extent than is natural silk and at the same time the rayon assumes the appearance of weighted real silk.

A process similar to the scrooping method for real silk consists in treating the cloth in a cold bath of lactic or formic acid and then, without rinsing, enter into a bath containing about 3 pounds of olive oil soap to 100 gallons of water; the addition of gelatine to the soap bath is said to enhance the effect. Dilute mineral acids such as hydrochloric acid

are sometimes used for reducing luster, usually with unsatisfactory results, but monochloracetic acid in strengths up to 10% has been employed abroad. Heberlein & Company, B.P. 264,529, have patented processes for the delustering of rayon with caustic soda solutions of mercerizing strength or with sulphuric acid of over 42°Be. with the addition of alcohols, formaldehyde, and ammonium salts to limit the swelling action. Luster may also be reduced mechanically by treatment of the fabric with a slightly abrasive powder such as calcium carbonate.

Celanese can be delustered by working goods containing this fiber for 30 to 60 minutes in water heated to temperatures above 185° F.; the addition of small amounts of soda ash to the bath aids in delustering. Mullin states that a delustered or "egg shell" finish with excellent effects may be obtained on celanese by treating the fabric for about 45 minutes in a bath containing about 2 pounds olive oil soap, 5 pounds Turkey red oil, and ¼ pound soda ash.

For calendering cotton-rayon piece goods a three-bowl silk calender is sometimes used. Recently several new types of machinery designed especially for finishing rayon piece goods have been introduced.

Science Offers Increasingly Powerful Weapons for the Attack on Rayon Research Problems

Progress Measured by the Degree to Which Industry Utilizes What Science Has to Give

By Edward R. Schwarz, S.B., A.T.I.

RAYON, despite its vaunted novelty, is no new thing. The large-scale production of it, and the realization of its manifold uses, however, are new. Although millions of pounds are manufactured annually, rayon is not yet thoroughly understood, and it remains for modern science to attack the problem of complete understanding with every means at its command.

Regarded from the standpoint of years of service to mankind, rayon will be recognized as the baby of the family of textile fibers. In several repects this is fortunate. Since it is a man-made filament, it is amenable to control in all its many phases, and, moreover, having been developed in modern times, its producers have the advantage of the knowledge provided through modern science. The perfection of its progress and achievements will be measured by the degree to which the industry utilizes what science has to give. Great strides have been made scientifically in the last few years, and only a prophet of much foresight and great courage can outline the triumphs of the future. Slowly men are getting a start on the solution of the age-old mystery of the nature of matter, and in their efforts a vast array of discoveries is being assembled. Many of these discoveries have applications to rayon, the importance of which is not dreamed of.

In the early days of science, reliance was largely on the five senses, and any problems whose solution could not be obtained by their unaided use were extremely likely to remain unsolved. Today these same senses are invaluable, but they are no longer without assistance. The rayon manufacturer, salesman, or user who fails to fully appreciate this fact in terms of up-to-date knowledge has no one but himself to blame for much lack of success. The human touch is made supersensitive by means of delicate mechanisms, while human strength has been enormously increased by powerful machines. Not only have these devices been developed in capacity and broadened in scope, but science has rendered them more and more susceptible to precise control.

What Microscope Shows

Rayon fiber, which appears to the naked eye as a filament of cobweb fineness—so fine as to be invisible in certain light—is seen under the microscope as a broad strand of unique conformation. By the use of proper accessories, almost any desired measurement may be made upon it. The number, spacing, and characteristics of the surface markings, which will surely affect the luster of the finished goods, can be obtained. The shape and area of the cross-section, and from this, the density of the material can be found. The use of polarized light shows a great deal of value about the molecular or atomic structure. The effects of chemicals can be quantitatively studied. Dye penetration can be measured. Yarn deformation due to calendering, etc., can be shown. In brief, the microscope and its accessory equipment open up a most fruitful field of investigation.

To even attempt to outline what electricity, and the modern progress in this line can mean to the rayon industry would call for an article in itself. Suffice it to say that it is as a right hand to the scientist and manufacturer alike. It furnishes uniform speed and steady power for all the machinery of rayon manufacture, and likewise, can furnish the energy to operate apparatus for determining the strength of single rayon filaments. In this connection it not only operates the machine but is the agent for the precise determination of the units of load applied. It serves to energize the X-ray tube, by means of which a yet unknown amount of data of first importance to the industry may be obtained.

Double Refraction of Light

For many years it has been known that cellulose causes double refraction of light and must possess some crystalline characteristics. The study of doubly refractive materials in the form of chemical crystals and minerals in rock sections, has been carried out for a long time by means of a special polarizing microscope known as a petrographical instrument. Similar work for textile fibers, including rayon, has been only incompletely investigated. The possibilities offered in this direction are many. Light, in passing through the polarizing microscope and the object to be examined, shows the material in a remarkably beautiful array of colors, although the specimen itself may be naturally colorless. Differences in thickness, and in mechanical strain produce changes in these colors which are possible of interpretation with comparative ease. Differences in the shape of cross sections can be plotted without cutting the fiber, and measurements of index of refraction are comparatively simple.

The changes in coloration due to strain are being extensively used in the stress analyses of structural members not susceptible of mathematical treatment. Models are carefully built to exact scale of some material such as celluloid, which when subjected to strain will show coloration in polarized light. The textile technologist has no need to bother with a scale model, since his material is ready for test just as it is. It should be quite possible to arrange a polarizing microscope in such a manner as to be focused on a rayon yarn or filament, while the latter was being progressively strained by a series of known loads, applied electrically, hydraulically, or mechanically. Just what the effects of changing humidity in the atmosphere, and of absorption of moisture to the point of saturation in water were, are thus made visible.

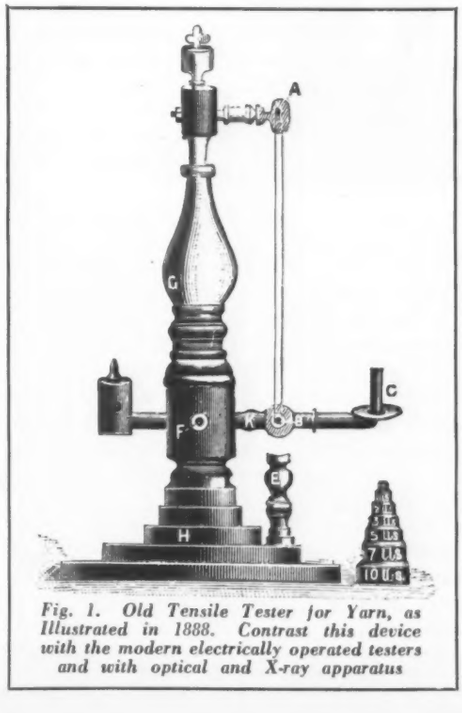


Fig. 1. Old Tensile Tester for Yarn, as Illustrated in 1888. Contrast this device with the modern electrically operated testers and with optical and X-ray apparatus

According to Dr. G. L. Clark who has done some research in this country on the structure of rayons—"The field of practical X-ray examination of textile fibers for information concerning uniformity, dyeing, heat, light ageing, effects of chemical reagents and laundering, etc., is still practically untouched but promises much for the textile industry." R. O. Herzog, leading foreign exponent of textile ap-

plications of X-ray analysis, had the following to say at the Spring meeting of the British Textile Institute, held this year in Cologne—"Besides the working medium which has advanced our knowledge in both spheres (physics and chemistry), namely, the examination by means of X-rays, the application of newer—particularly optical—methods appears to be necessary."

Utilizing a beam of X-rays—similar to the beam of light, but having a wave-length about 1/6000 as great as yellow light—it is possible to photograph the diffraction diagrams for rayons. Ordinary light may be diffracted by means of a ruled grating of closely spaced lines on a piece of glass or metal. X-rays are so short that they will pass through such a grating without being affected, just as light—to give a crude illustration—would pass through a picket fence. The regular arrangement of atoms in layers in a crystalline substance, however, serves as a diffraction grating for the X-ray beam, and a definite diagram results, from which the atomic spacing may be accurately calculated and by means of which changes in the spacing due to chemical rearrangement, swelling, etc., may be seen. Tension during the spinning results in a degree of orientation or *"lining up"* of the micells, and this more or less regular arrangement results in the so-called "fiber diagram."

Asbestos may be taken as the perfect fiber, while the rayons show only imperfect fibering. The definite arrangement of the spots at the left of Fig. 3 shows the points of bombardment of X-rays, diverted from their straight path by the crystalline structure of the asbestos fiber. At the right is shown a definite enlargement of the annular rings which indicates a certain degree of orientation in this sample of viscose rayon. Changes in the degree of "lining-up" should have an effect upon the physical properties of the filament. Such research as that to which this leads is well worth while, and apparatus and technique are constantly being developed for its further pursuit.

There are many practical problems which can be studied advantageously by one or more of the above methods. These methods may be taken as quite typical of the sort of thing placed by science at the disposal of the textile technologist, as soon as he realizes the tremendous assistance they can afford him. Various investigators have noticed the fact that at least viscose and acetate, and probably the other rayons, show the change in tensile strength and stretch at a point part way between the condition of saturation in water and a state of "air dryness." During this period, which may last for some minutes, the material has a very much lower stretch than at any other time in its drying. Thus it would appear that if rayon in processes such as tentering is subjected to strain and drying simultaneously, there is a grave danger of damage being done, because of the "brittleness" of the fiber.

(Courtesy Spencer Lens Co.)

Fig. 2. Polarizing Microscope. This instrument is inexpensive and extremely valuable for many textile determinations. The polarizing equipment is interchangeable with standard condenser, and the large rotating stage makes measurement of twist angle, etc., very easy. It is typical of modern laboratory apparatus for the study of textile problems and for research

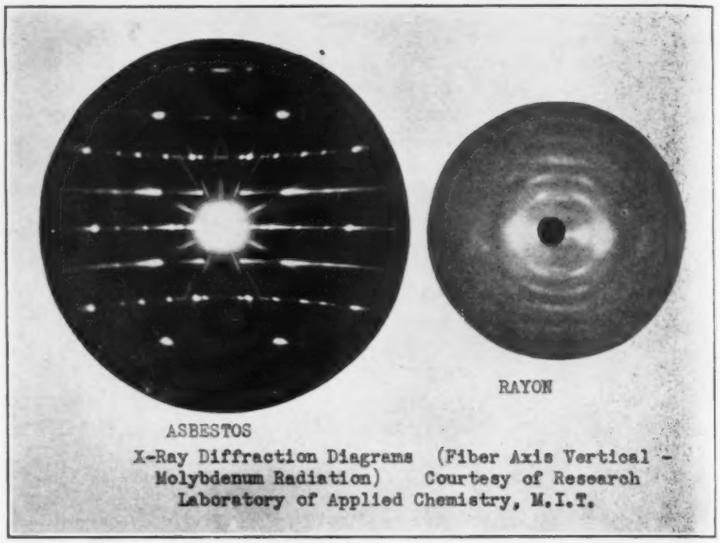

RAYON
ASBESTOS
X-Ray Diffraction Diagrams (Fiber Axis Vertical - Molybdenum Radiation) Courtesy of Research Laboratory of Applied Chemistry, M.I.T.

Fig. 3. Typical X-Ray Fiber Diagrams for Asbestos and Viscose. Ex-ray equipment is making clearer the fundamental structure of the textile fibers, and explaining many of the results of physical and chemical treatment. A striking example of what modern science can offer in aid of textile research.

There have been many cases of this nature. In one which came to the attention of the writer, a spray of water had to be introduced part way down the tenter to prevent this condition. Just what happens here is not understood. Various theories have been advanced, but as far as the writer is aware, none have been substantiated by any real investigation. The use of modern equipment and procedure in the light of the latest scientific knowledge should result in the complete explanation.

Men and Equipment

In the scope of such an article as this, it is manifestly impossible to touch upon more than two or three specific instances. It should not be supposed, therefore, that the developments of particular interest in connection with rayons are limited to those discussed here. What have been mentioned were selected as representative of what may be expected to be useful tools for the textile laboratory. No longer is the well equipped textile laboratory complete with only its complement of testing machines, scales, oven, etc. Optical equipment of varied nature, electrical measuring devices, X-ray, spectrophotometric apparatus, etc., must also be included. There is therefore sure to be a demand for men with a technical training in physics and chemistry, and with a knowledge of the peculiar problems of the textile industry to handle the equipment efficiently. Our universities are ready to train such men as soon as the industry will demand their services, and make it evident that it will be a service with a future. The Massachusetts Institute of Technology, for example, has already laid the ground work for such a course.

The increasingly powerful and, at the same time, accurate and delicate instruments and processes made available by modern research in physics, mechanics, and chemistry, should be utilized fully by the textile industry, and therefore by the manufacturers and users of rayon. Not only will valuable fundamental data be accumulated, but practical problems of production and handling will be solved. In the hands of far-seeing workers discoveries of inestimable value will be made. Let us continue to use the senses with which we are naturally endowed, but let us not fail also to complement them with the best assistance which science can provide. To do less is to handicap the progress and successful use of the first great man-made fiber—which itself is the direct result of science.

Great Future for Staple Fiber in Production of New Types of Product

Foundation Laid for Widening Field Of Artificial Fibers—New Qualities

By a British Correspondent

THE big and healthy baby of the textile fiber family—rayon—at its present rate of growth is making striking progress toward maturity, if the production of some other fibers denotes full-growth. It is estimated that in only ten years from now the amount produced of the newer fiber will equal the production of grease wool—2,000,000 tons. Beyond that it is probably unwise to prophesy, but one's own impressions remain.

Rayon is considered to be more than a decorative fiber, and recent efforts have been in the direction of making it a dependable "clothing" fiber, with attractive qualities for selling and display, handle more in accord with soft, fine wool, "air spaces" in yarn to give heat-retaining properties, and durability when given hard wear in workshop or office. The early uses of rayon were purely artistic and in that capacity this fiber helped to sell many fabrics that were composed mostly of other textile materials. Now, articles of clothing of all classes and for all garments are being produced from 100% rayon (men's suitings and overcoatings alone excluded), and each year these are proving to be more durable and satisfactory.

Rayon suffers somewhat in its origin. Some people sneeringly refer to to it as "wood pulp." But rayon has lived down many fallacies, so that the use of the word at the moment conjures up huge forests, gigantic factories, highly skilled technically trained foremen and workers, monied directors, and good dividends.

Tremendous Opportunities in New Fields

Rayon yarns and fabrics are still largely of the highly lustered class, though it is felt that as an artificial wool it would have a great use and a great sale. The first makers of rayon aimed at producing an imitation silk. This was commendable in view of the pleasing nature and high value of the material. However, the uses of silk are limited, and if rayon were to be an artificial or imitation silk only, the amount at present produced would more than meet requirements. To substitute for wool, (a fiber with greater demands) or to replace cotton in the latter's highest employment after bleaching and mercerizing will, if successful open up markets of almost unlimited expanse, and enable rayon to become the world's leading textile fiber. In doing this, the material will outgrow the name by which it is known in England—artificial silk.

In the imitation of silk, the filament yarns in character and in method of production are the nearest that can be imagined to silk. If anything needs to be said further on this point, it is that the imitation has been too good and a less successfully lustered fiber would be more serviceable to the industry. In the imitation or substitution for worsted, woolen, and cotton yarns, a different kind of material and another method of processing are necessary.

In making artificial silk, the silkworm method of manufacture was copied; the natural method and the synthetic had many points in common. If it is desired to produce synthetic "wool," it would be difficult if not impossible to copy the sheep as to method, though not so difficult to attain a similar result. However, rayon manufacturers have concluded that to spin the yarn, then cut it up into wool fiber lengths of four, six, or nine inches, or cotton fiber lengths of one to one and one-half inches, is to obtain tolerable imitations of these natural fibers.

New Qualities Needed

But length is probably one of the least important of the properties possessed by textile fibers; at least from almost all standpoints but the manipulative. Before rayon can substitute for the better known fibers, a closer resemblance in every way will be necessary. The luster must be suppressed, the handle softened, and the fiber made more resistant to rubbing and temperature and humidity changes. Its appearance must be given a lessened look of "artificiality." By doing this, by approximating in close degree to the attributes of natural fibers, and by "coming in at a price," rayon will continue its conquest of the textile world.

The cut fibers, "fibro" or "vistra," are received by the spinner in splendidly arranged condition, all fibers the same length and packed neatly (on account of easy transit) in tied-up bundles. To obtain continuity of length again, since "cutting" has destroyed that feature, is now the immediate aim of the spinner. The arrangement of fibers is disturbed by the rough and tumble of the garnett machines and cards, yet from the latter a sliver is obtained in which can be seen yarn possibilities.

The carded slivers are combed to remove minor blemishes incident on carding, and further processes draw out the thick sliver to roving from which yarn can be produced. Now what has been gained by this change from filament to spun yarn? Attributes which it is desired shall be in the finished cloth. A new arrangement of fibers in the yarn, embracing more air spaces, giving outstanding fibers, incorporating twist, each of which jointly and severally swell the yarn diameters for the counts and produce, when woven, cloths of superior handle and warmth, yet brighter than either cotton or wool in appearance. Nor is this all, for blended with the other fibers, economic piece-dyeing lends effects of superlative attraction and selling assistance in the retail stores. Readers may say, "we have heard or read of all this before; is that the conclusion of the matter"? No. All possibilities have not yet been achieved, nor even a good start made on them.

New Fiber with Wool-Rayon Qualities

There is a great stir in the West Riding textile centers of England just now because of the discovery or production of a new fiber with wool-art.-silk features, for which a name has not yet been found. This material is the nearest approach to wool that has been seen among synthetically produced fibers, and is about 20c per pound cheaper than wool of the same fineness. The makers hope that this material will displace the cut or staple rayon for blending with wool. It needs no emphasis of mine to show that expectation is great in this direction, and that once the right kind of fiber is made, big business may be expected.

The new fiber is the best wool substitute yet made, but it is lacking in handle, being equal to about 56s quality wool. So that if bought for fineness it is obtained 20c per pound cheaper than wool of similar quality, but if bought by handle it is the same price as wool. For cross-dyeing effects it will have a welcome place in industry, and its introduction marks the beginning of a new era in which synthetic wools will be much to the front. It is not generally known what origin the new fiber has, but examination leads to the belief that it is the former ramie in a more decorticated, wool-like presentation. In its new form—delustered—it works up better than before, although its lack of extensibility militates against its whole-hearted adoption by the industry.

More Use of Fiber Mixing

Fiber mixing is more and more practiced daily; not only staple rayon with wool or cotton, but acetate rayon with viscose, and each or both with wool or cotton or the new fiber. It was formerly a crime in England to mix wools of varied qualities and origins. Now fabrics cannot have too many different materials, so great is the demand for novelty, provided that the soft handle is always retained.

One difficulty still to be overcome by novices in using staple rayon, especially the short fibers used either alone or blended with cotton, is to give the yarn strength necessary for weaving. Too often the application of weight on the warp beam causes the fibers to pull out and the yarn to break. The absence of convolutions on the rayon is felt, and extra twist in the yarn is a dangerous expedient.

In Yorkshire, the use of staple rayon is growing apace, the largest comber of this material having just doubled his plant and moved into larger premises. Combed rayon tops can be obtained in three qualities, varied lengths of fiber, and practically any color. The foundations for big business have been laid, and we feel sure that the optimism which prevails is well founded.

Developments in Dyeing, Delustering, Scrooping, and Related Rayon Processes

Producers Are Utilizing Every Phase of Mechanical and Chemical Science to Perfect Products

*By P. D. Atwood**

IN the following paragraphs we will discuss, in a general way, trends and developments in the processes of dyeing, delustering, and scrooping rayon, largely devoting our remarks to viscose-type yarns, although presenting some general remarks on the cellulose acetate type.

Experience, coupled with the facts developed by research, leads to the conclusion that the fundamental cause of deviations and difficulties experienced with rayons lies in the variations in the structure of the fiber. These result from differences in the raw material, spinning and processing of the rayon. The correction of these variations is recognized as a problem for the rayon manufacturer, who is utilizing every phase of mechanical and chemical science in an effort to perfect the uniformity and quality of rayon.

There are several major difficulties which the rayon user experiences, and the varying affinity for synthetic dyestuffs still remains one of these major problems. However, the fact remains that the practical dyer must produce results suitable for the consumer regardless of any inherent difficulties which the rayon manufacturer is combating. The dyestuffs manufacturer has accordingly been approached for a possible partial solution of the problem and his aid has been very valuable.

The results of the development work done by dyers and dye manufacturers have established the fact that certain colors accentuate the difference in affinity of the fiber for colors, while others minimize this difference. Their efforts have certainly partially reduced the difficulties experienced in dyeing rayon.

Dyestuff Selection and Application

The following points resulting from the developments of dye manufacturers and rayon producers are of interest to note. Experiments have shown that those dyestuffs which reach the maximum of their exhaustion in the shortest time will prove most suitable for practical purposes. With some dyestuffs it is necessary to make additions of substances, such as Glauber's salt, to increase the absorption of the dyestuff by rayon. Other colors will be absorbed to a greater extent without the aid of these additions and those dyestuffs possessing sufficient affinity for the rayon not to require assistance in exhaustion will as a rule prove most satisfactory. The less assistance we use during exhaustion and the more rapid the rate of application, the more even is the dyeing.

From the above points it is obvious that the proper selection of dyestuffs and care in their application is highly essential for good results. In addition to these general developments we find that the various phases of the textile industry, such as hosiery and underwear manufacturing, skein dyeing and piece goods processing and dyeing, all have their individual problems and that developments have resulted in these phases of the industry.

Satisfactory Unions in Hosiery Combinations

In the hosiery trade the chief difficulty is to obtain satisfactory unions between rayon and the other fibers used in combination, generally mercerized cotton, silk and wool. The preparation of the hosiery by preliminary boil-off, and in some cases bleaching, has received considerable attention. The dyer and rayon manufacturer have both come to the realization that these preparatory steps must be easily and thoroughly accomplished, leaving a uniform result, before satisfactory application of the dyestuffs can be accomplished. It is not within the scope of this article to go into the details of the developments made in boil-off and bleaching treatments. However, much has been done toward eliminating the irregularities commonly experienced in these procedures. Soaps and oils have been developed to be used as aids in these processes.

Experience has shown that it is, in general, essential to select those dyestuffs which are union colors with all the fibers in the combination. These selected dyestuffs are applied at the boil. Speeding up the dyeing operation and using assistants such as Glauber's salt in the bath all tend to aid.

Barre in Underwear Fabrics

The dyeing of knitted underwear fabrics presents the difficulty of barre. Barre may be produced by variations in tension during knitting, by variations in the oiling of the yarn which produce differences in knitting tensions, by actual denier and filament count variations, and by the aforementioned differences in dye affinity of the rayon.

Up to the present time the best methods of minimizing or eliminating this barre are by dyeing at high temperatures (from 180 to 212° F.) and, of course, selecting the most suitable dyestuffs. The addition of oils such as pine oil, which has a detergent action in the boil-off and aids in penetration and leveling during dyeing, has been found very desirable.

The use of squeeze rolls on the rope type dye machine is receiving much thought. As little use as possible should be made of such rolls in view of the fact that most ordinary rolls tend to produce lengthwise dyeing streaks in the tubing. The tendency is to eliminate squeeze rolls entirely, as they give additional trouble from pinching and damaging the wet tubing.

Dyeing Rayon in Skeins

Skein dyeing produces an entirely different problem because the temperature of dyeing rayon skeins must be so adjusted that poor winding does not result. Extremely high temperatures are not desirable, also excessive handling of the skeins in the dye bath tends to tangle and muss them so that poor winding may result.

Skeins are commonly dyed either by hand turning or on machines. Dyers are coming to the realization that extreme care is necessary in handling skeins, during dyeing, the winding qualities of the yarn being largely dependent upon the care with which the skein is handled during dyeing. Other factors affecting the dyeing are accuracy of diamond formation, type of lacing (rayon lacings have a tendency to slip and bunch together during dyeing) and the number of lacings per skein.

Skein dyeing equipment is being gradually changed from the wooden tanks to either copper or monel metal. All poles and trucks upon which the yarn is handled are either being carefully finished or covered with some substance, such as oil cloth, so that no rough surface can damage the rayon filaments.

Present practice in skein dyeing shows a tendency toward equipping with monel metal. Experience has taught the dyer how to dye by machine and still obtain a skein that will wind satisfactorily. Originally, much difficulty was encountered with machine dyeing. The heavier denier yarns are the most easily and successfully handled in machine dyeing, and in addition, higher temperatures can be used successfully.

Dyers are using their own ingenious methods to obtain the shades and effects required. Direct dyes are most used on viscose-type rayons, and in some cases where brilliancy is desired, the dyer resorts to topping over the direct dye with a basic dye, although such practice is not recommended due to the lack of fastness of basic colors. Vat colors are being used more because of greater fastness.

Piece Goods Dyeing and Printing

Piece goods dyeing and printing is such a large field within itself that we cannot hope to cover even the essential points in this article. Generally speaking, piece goods are handled on a rope machine of the Rodney Hunt type, or a jig-type machine where the cloth is under slight tension during dyeing.

Practically all dye houses and finishing concerns have come to the realization that in boiling-off, processing and dyeing rayon it is very desirable to have soft water, or at least, to use a treated water which will minimize soap spots and curd formation during the oil removal and following procedures.

Dyeing Cellulose Acetate Products

It is of interest to note the following developments in the cellulose

* Dupont Rayon Co., Inc.

acetate field. The dyeing of this type yarn has given considerable difficulty in the past, and only comparatively recently has the dyestuffs manufacturer succeeded in producing a satisfactory line of dyes. The dyestuffs have been developed to the place where they are now available in powder form instead of the paste form. Formerly, the range of colors which were used on cellulose acetate were rather limited. Recently, the acetate series of dyestuffs has been improved and widened considerably, although there still remain some unsatisfactory gaps in the applicable colors. The trade now has a fairly suitable line of direct colors.

One of the greatest aids to acetate dyeing has been the development of wetting-out agents, of which the Nekals and Leonils are excellent examples. The lack of the moisture absorptive power of cellulose acetate has made the addition of wetting-out agents in dyeing procedures very essential.

Delustering Rayon

There has been a growing demand for a viscose-type rayon with a luster approaching or equal to that of silk, and toward this end various manufacturers have directed much research and development effort. A delustered yarn is of particular value in the hosiery trade, and as far as we know, this branch of the industry is the greatest user at the present time. The present trend seems to indicate the growing use of a delustered yarn in other fields, particularly the fine underwear trade.

A delustered yarn must essentially be so prepared or treated that the delustering effect will be permanent to washing and ironing, and also to the action of steam boarding in the case of hosiery. It is very essential that the delustering medium does not affect the dyeing properties of the yarn. Some of the present delustered yarns meet these requirements within reasonable limits, and there is indication that in the future even more permanency and uniformity will be secured.

The following brief summary will give some idea of the present recognized methods of obtaining delustering of viscose-type yarns:

(1) Mechanical abrasion of the surface of the thread. This roughening of the surface should produce the desired effect of decreasing light reflection, and thus reducing luster, but the possibilities of injury to the filaments seem almost too great to permit this process to be entirely practical.

(All of the processes here mentioned are patented, and some of them are at present producing a salable delustered rayon.)

(2) Deposition of material on the surface of the thread. This is usually accomplished either by precipitation of a finely divided substance on the surface of the thread, or by the absorption of a substrata on the thread, and then depositing a finely divided pigment on this substrata. The precipitation of barium sulphate as a delustering agent is a good example of the former method.

(3) Impregnation of the viscose with some substance which renders the thread opaque. An example is the addition of sodium carbonate which causes liberation of carbon dioxide during spinning, and forms essentially a hollow filament thread which gives very satisfactory delustering, due to the occluded gas. In addition to the above, it is possible to add sodium sulphite to the viscose spinning solution, which during spinning not only liberates sulphur dioxide, leaving gas pockets in the filaments, but also precipitates a pigment of sulphur.

(4) The addition of pigments to the viscose which produce a delustered effect. It is quite feasible to add sulphur directly to the viscose.

(5) The addition of vaselines or light oils to the viscose, which are apparently liberated during spinning, leaving an oilless thread but producing the delustered effect.

All of these processes have been tried, and some of them are quite practical and are in use. Much work is being done on the control of these processes, and the increase of their permanency.

Scrooping Rayon

Up to the present time, there has been very little tendency toward the development of scroop in viscose-type yarns. It is quite easy to produce a scroop, but generally the effect is not very permanent. Continued washing, and even handling, has a tendency to remove the scroop effect. There are cases where scroop is applied to viscose-type yarn, one example of note being the hosiery trade, where tartaric acid has been used to impart scroop to the finished hose.

Further Rayon Growth Inevitable

Cooperation Between Yarn Producers and Textile Manufacturers Vitally Important

By L. H. Bonn

ALMOST as an accompaniment of success to every great industry, particularly one of very rapid and extensive development, comes a warning that the saturation point, so called, has been reached or is impending.

Ten years ago few could visualize the future magnitude of operations of a comparatively small group of firms in the rayon industry. Today the industry in the United States alone is producing 100,000,000 lbs. a year. Further expansion and new construction are under way.

It is interesting to note that the programs for further expansion are being carried out exclusively by either established domestic manufacturers of well tested rayons or by European manufacturers who have sold their yarns in this market for many years.

One not involved directly in the industry, perhaps interested only casually from the investment standpoint, is quite apt to challenge the capacity of this market to absorb over 125,000,000 lbs. of rayon per year which is the estimated production program for 1929 of the American producers.

Ten years ago, in 1918, when our production amounted to 5,800,000 lbs. and total consumption to a little over 6,000,000 lbs. a limited poundage only at that time could be properly assimilated. Rayon at that time was of inherently poor quality as compared with today's product; it still has its limitations of usefulness for certain fabrics because of its comparative inferiority and mills had not yet become accustomed to handle the new fiber to advantage.

It was really not until 1925, with an American production of 50,000,000 lbs., that a fairly broad usefulness for rayon had been found. Yarn quality had been improved remarkably and with improvement in yarn quality had come a greater knowledge of its application to all types of equipment.

New Era in Distribution

Along with a marked improvement in the raw material and its ready and broad application in a diversity of fabrics, since 1925 has come a special consciousness on the part of the industry as a whole for merchandising.

It would seem almost as though a new era in distribution had developed—an era in which a manufacturer producing a raw material which almost entirely loses its identity in the finished product, lends his cooperation in the broadening of the distribution markets.

Such coordination of effort can only be beneficial to both parties concerned. The manufacturer of rayon has gained greater individualism as expressed in the varied types of yarns now marketed which are particularly adaptable to special uses. The manufacturer of rayon is better able to cope with the difficulties of fabrication by improving his process to give better results in the use of the fiber. He is thereby able to broaden the use of his yarn in the field to which it may already be applied and to further diversify its uses by developing new lines.

The distributor of rayon fabrics benefits by this cooperation through a wider sale of his merchandise. The coordinated advertising programs as developed by some manufacturers and distributors lead to the dissemination of educational information which could be accomplished in no other way. The elimination of prejudices on the part of the consumer, the development of a style consciousness for rayon fabrics and a broadening of knowledge of the limitations and possibilities of such materials, all go toward improving the great potential market.

Manufacturers of rayon have come to appreciate a greater need for control, since distribution of inferior constructions, or use of improper production methods to cheapen the ultimate cost of the finished fabric or garment, has been found to reflect directly upon the fiber.

To develop further the knowledge of the new rayon fabrics, the Rayon Institute has been established through the coordinated efforts of a group of manufacturers of viscose yarns.

The combined and individual efforts of manufacturers of rayon in their advanced programs of production and distribution have extended over a period of four to five years only. The consumer today is just beginning to realize the potential characteristics and qualities of rayons from the standpoint of style, beauty, utility and economy. Real results of the efforts of the industry will not be felt for at least five years.

(*Continued on page* 96)

Dyes for Viscose Rayon—Use of Even-Dyeing Colors For Special Effects

Choice for Use on Uneven Viscose—Table of Most Suitable Dyes—Tests

By Westford

VISCOSE rayon, although turned out in a highly perfected form by the more experienced manufacturers, is still subject to irregularities in dyeing which are distinct from ordinary unevenness. Bars in woven or knitted goods, or differences from skein to skein in dyed lots, may be due to variations in the rayon itself in spite of every effort by the manufacturer to avoid such defects. Other light streaks which show in knitted or woven work are due to strain on the rayon at some time during processing. Such are shiners, where the silk has been so stretched, perhaps while wet, that it has failed to come back to its proper length. Strains of this sort make the fibers more lustrous, so that they shine out from the average. At the same time the minute cellulose units of which the filaments are composed become more tightly packed together, or otherwise displaced, so that the internal surface available for dyeing is decreased and a lighter color results.

Some uneven dyeing has been observed in all regenerated cellulose rayons, but it is more widely recognized in the viscose which is so much more extensively used.

The actual variations in the materials and in dyeing are less than are encountered with many natural fibers. The latter have the advantage that they are thoroughly mixed and the color thus averaged. On the other hand, all the filaments in a strand of rayon are formed at once under the same conditions. There is no averaging or mixing unless the yarns are doubled or thrown together, or woven with alternate picks from different shuttles.

The influence of tension, temperature of drying, and such factors is not unfamiliar. Other fibers are somewhat affected by them, even ordinary cotton yarn. Since rayon swells more and softens when wet it is easily affected. If parts are under strain when knitted, there may also be a permanent effect on the dyeing capacity.

List of Selected Dyes

Viscose rayon has been extensively studied in a number of laboratories and lists of the dyes that work the best have been published. The lists available are very largely of British-made dyes, but by the aid of the Colour Index and of the dye tables in the 1927 Year Book of the American Association of Textile Chemists and Colorists they have been translated as far as possible into terms of the identical or very similar American-made dyes.

Although uneven rayon may not be regularly encountered, the use of such selected dyes is insurance against troubles that may appear from time to time in the original rayon, through strains to which it has been subjected, or where yarn lots have become mixed before dyeing. The writer has also found that some dyes from the tables gave better results than the average in certain union dyeings.

Therefore this list should be kept in mind when there is a problem in dyeing more than one type of rayon or other cellulose to some given shade. No general rule can be offered nor any broad statement made, but it is certain that some of the colors best adapted to dyeing uneven rayon, which is in itself a sort of union, are far superior to a great many other dyes for some fiber combinations. At least one dye manufacturer has also had a similar experience.

In the table the dyes originally given in various sources are presented in the first column and their American-made equivalents or similar dyes in the second. There is no sharp distinction between good colors and those that are not quite so good. It may be emphasized again that these dyes are not classed according to the ordinary standards of level dyeing, but only with special reference to uneven or faulty viscose rayon.

Owing to the unavoidable incompleteness of the tables several methods are also presented for testing dyes to determine their behavior on uneven viscose silk. Even though listed together in a table, dyes will not necessarily work well together in a dyebath. These test methods are therefore especially applicable in working out suitable combinations for compound shades. They are also adaptable to other special purposes.

Tests for Suitability

From the theoretical point of view the observation of Wilson and Imison in 1920 is very interesting: that direct dyes of low molecular weight tend to dye evenly; those of high molecular weight, unevenly; and intermediate molecular weights, between. Since the necessary data are not available to most laboratories and dyehouses, and since dyes vary so widely chemically, aside from the molecular weights, each has to be given some more practical form of test.

Dye tests are easily made, but to really determine the properties of a given dye is usually an extended process. In fact one of our great textile research needs is detailed and accurate knowledge of the properties of individual dyestuffs. To classify dyes for viscose rayon there are both simple tests and some that require more time for their performance. In general, the tests are preferable that give a numerical result or that tell most about the color in question.

Hall has found a method for determining very quickly whether dyes are likely to be "even-dyeing" on uneven viscose. Viscose rayon treated for four hours at room temperature with a five per cent. solution of caustic soda is washed and soured, then dyed in the same bath with similar viscose that has not been so treated. If the two rayons come to the same depth of shade, the color being tested can be expected to dye evenly.

Another simple non-quantitative test is that with soap. The color to be tested is dyed on viscose rayon. Then the dyed material is boiled for half an hour in a soap bath with an equal weight of undyed viscose. With uneven dyeing colors, the dye does not bleed seriously or greatly stain the white. With even dyeing colors the two samples may be very nearly of equal depths after the test. Other dyes grade between.

This test may seem inconsistent with the fact that the rapidly exhausting colors give the most even shades. They are most successful because, although they go on quickly, they boil off again and level up in the bath, just as in the test.

The suction or capillary test depends upon the creep of a dyestuff up a strand of rayon that is dipped into a dyebath. The bath may be varied to correspond with different practical dyeing conditions. For a standard test, a strand of rayon about fifteen inches long is dipped for an inch into a dyebath in the proportions

400 cc. water
0.4 gram of direct dyestuff
0.2 gram soap
1.0 gram Glaubers salt

for fifteen minutes at 60°C. (140° F.).

The quantity to be measured is the height of rise of the color in the rayon. A low rise means a greater affinity and a more even dyeing color. Unfortunately the issue has been confused by the use of the length of the uncolored portion of the thread as a measure of uneveness of dyeing. This gives a series of numbers in the reverse order to the actual dye rise, and the numerical values depend upon the original length of strand taken. It seems preferable to express the results in actual dye rise in centimeters or inches, rather than to have two systems so near alike and yet so different.

Working Out Compound Shades

Dyes of the same number will work better together than dyes of different numbers. It is better to use uneven dyeing colors together in compound shades than to mix the uneven with even-dyeing types. Dyes for compound shades should be selected by testing together as nearly as possible as they are to be used in final formulas.

Arthur S. Roberts, in TEXTILE WORLD of Feb. 25, 1928 has described and sketched a simple apparatus which has been successfully used for

making capillary measurements. Here the method was especially recommended to aid in the choice of dyes for compound shades.

Courtaulds claim the temperature range better than the suction test because some dyes with about the same suction numbers behave differently when compared at various temperatures. This method has been given in TEXTILE WORLD of April 28, 1928, but will be briefly repeated.

Eight identical dyebaths are prepared, using as a standard for depth a ½% dyeing of ordinary Sky Blue FF (or 6B) at 90°C. Always use 2% soap and 10% Glauber's salt in a bath of forty times the weight of viscose to be dyed. The results are more likely to be correct if a single large dyebath is divided into eight equal parts.

Then identical skeins of viscose, preferably from the same commercial skein, are dyed through a temperature range at steps of ten, from 20°C. to 90°C. Very great differences in dye behavior will be found.

Colors that dye the deepest at 20°C. will give the most even results, but they are to be dyed at the usual temperature in practical work, not at 20°. Those that dye the deepest shades at 90° will give the most uneven results.

The rule for compound shades is that dyes should be selected which go on at the same rate at the same temperatures, with the preference for those that show the maximum affinity at 20°C., if such are available.

If the highest affinity is at a high temperature, a dye that also yields a heavy shade at a low temperature will be better than one which dyes heavily only at high temperatures. For example, a Sky Blue FF shows some affinity at 20° and a maximum at 90°, while a Fast Blue 4GL only dyed an appreciable shade at 50–60° and a maximum at 90°. The first would be the better dye for even dyeing.

Still another test for compound shades is to make a range of dyeings in identical baths with a variation in the time; for example, for 5, 10, 20, 25 and 30 minutes, or 1, 2, 3, 4, 5 and 30 minutes as may best fit the case. With even dyeing colors, all the dyeings should be of nearly the same depth and of the same tone. Uneven colors will increase in depth of shade with time and be of the same tone. If unsuitable colors have been tried together in this way the results will vary in tone as well as in depth.

In general the tests given presuppose that the rayon is to be dyed in a soap bath at a high temperature, when the following observations will apply:

The higher the temperature of the bath, the more even the result. If begun at a moderate temperature, the dyeing should be completed near the boil. (85°–95° C. or 185°–200° F.)

From 2% to 6% of soap is commonly used. It not only aids evenness of dyeing but tends to minimize damage from friction.

The use of either common salt or Glauber's salt is to be avoided as far as possible as they increase the liability to unevenness. Some of the dyes have a considerable affinity for viscose in a soap bath without their use. An unexhausted bath is better than an unlevel lot.

Probably no two dyes will behave exactly alike, but those of nearest similar even-dyeing quality should be used in compound shades. An advantage of the tests which give numerical results is that the dyes can be more accurately rated.

Horsfall and Lawrie suggest that since the difference in the dyeing seems to be mostly one of rate, the remedies are the use of a high temperature, concentrated dye bath (30 to 35 times), and a prolonged time. Other means of disturbing the ordinary relationships between fiber and dye lead to improvements with individual colors. Such are the omission of salt, its use in unusually large amount, or a slightly acid bath.

Research by Dye Manufacturers

Since the du Pont organization manufactures rayon as well as dyes it has been in a particularly advantageous position to study this problem. As a result of extended research, it has been concluded that the temperature and time factor tests are more reliable than the capillary rise, and of these two the first is preferred.

To conduct a test according to the du Pont scheme, five identical dyebaths are made containing 1% color, 2% high grade sulphonated oil, and 10% Glauber's salt in a bath of forty times the weight of rayon. Dyeings are made for 45 minutes at 80°, 120°, 160°, 190° to 200°, and at a gentle boil, to determine the temperature of maximum absorption.

Then two sets of tests are made to determine the rate of absorption, one set at 180°–190° and one at the temperature of the maximum as found above. The dyebaths are made in the same way as before and dyeings made in each set at 5, 10, 20, 40, and 60 minutes. The colors that are absorbed most quickly at low temperatures are preferred, but they are dyed in practice near the boil. It will be seen that these conclusions and methods are very similar to those that are favored by Courtaulds.

The unevenness is due evidently not so much to a difference in affinity as to a variation in the speed of dyeing. The dark dyeing viscose absorbs color more quickly, and therefore at the expense of the lighter. It is the low luster silk that tends to a deeper shade than normal, while stretched silk may be lighter.

Attention should be called to a few of the colors that are a little out of the ordinary. The Icyl dyes have been developed by the British Dyestuffs Corporation for the specific purpose of yielding even shades on uneven viscose. In some of their properties they are distinct from ordinary direct dyes, although they belong to that class. For the best results they should be dyed at 190° F. or nearer the boil.

Blues and greens have been the least satisfactory. The Diazo Sky Blue 3GL has been considered the best direct blue available. Very recently it has been found that the wool dye, Neolan Green BL (Society of Chemical Industry), dyes very evenly and is an exception among greens.

The table follows:

Table of Most Suitable Dyes

DYES FROM ORIGINAL LISTS	NEAREST AMERICAN EQUIVALENTS
Benzo Fast Black L Chlorazol Fast Black BK	Pontamine Fast Black LN, LND Amidine Fast Grey BN
Benzo Fast Bordeaux 6BL " " Eosine BL " " Heliotrope 2RL, BL " " Yellow RL, 4GL Extra	
Chlorantine Fast Yellow 4GL	Pontamine Fast Yellow 4 GL
Benzopurpurine 4B	Easily obtained from all makers.
Benzoform Scarlet B " Brown 4R " Fast Helio 2BL	
Brilliant Benzo Fast Yellow GL	
Chloramine Fast Black B	
Chlorantine Fast Bordeaux 2RL " " Violet BL, 4BL	
Chlorazol Black SD " Dark Green PL	Amanil Green 2G Amidine Dark Green N Erie Green WT
Chlorazol Brown G " " M	Amanil Brown M Amidine Brown M Direct Brown M, MB, MR " Fast Brown M Erie Fast Brown 3 RB Pacco Direct Brown M Pheno Brown ATY Pontamine Brown R Trianol Direct Fast Brown M
Chlorazol Brown B	Amanil Brown CL Conc. Etc. Direct Brown C, CR, D3G, D3GA, D3GX, 3GX, T. Direct Orange BR Erie Brown CN, 3GN Pacco Direct Brown C Paranol Direct Brown 3GC Pontamine Brown D3GN, DP, D3GP, 3GE Trianol Direct Brown C, 3GN
Chlorazol Diazo Blue 2B " Orange Brown X " Fast Bordeaux LK " Orange G " Orange RN	Amanil Fast Orange R Pontamine Orange R

DYES FROM ORIGINAL LISTS	NEAREST AMERICAN EQUIVALENTS
	Newport Direct Orange R
	Trianol Direct Orange R
" Fast Orange R	Erie Fast Orange A
" Fast Helio BK	
" Pink Y	Newport Direct Pink 2B
	Direct Brilliant Pink SX
	Direct Pink NY
	Direct Scarlet 6BX (Newport)
" Fast Rubine LF	
" Fast Red A, K	
" Fast Red FG	Amanil Fast Red FC
	Amidine Fast Red F
	Direct Fast Red F (Newport)
	Erie Fast Red FD
	Pacco Direct Fast Red F
	Paranol Direct Red FC
	Pontamine Fast Red F
	Trianol Direct Fast Red
Chlorazol Fast Yellow 5GK	Pontamine Light Yellow 5GX
" Fast Yellow 6G	Amidine Fast Yellow 5G
" Violet R	
" Violet WBX	Amidine Violet B
	Newport Direct Brill. Violet R Conc.
	Direct Violet R (C. C. C.), B
	Erie Violet WB
Chrysophenine G	Chrysophenine — Various brands and makers
Cotton Yellow CH	Erie Yellow Y
	Pontamine Yellow CH Etc.
	Direct Brilliant Yellow C
Cotton Yellow GI	
Congo Orange R	
Diamine Aldehyde Bordeaux B	
" Azo Fast Green G	
" Brilliant Violet B, 2R	
" Fast Yellow N, 4G	
Diaminogene Extra	
" Red B	
" Sky Blue N	
Diazo Brown 3G	
" Brilliant Orange 5G Ext., GR Ext.	
" Fast Scarlet B, BA	
" Fast Violet BL	
" Fast Yellow G, 2G	
" Indigo Blue 4GL Ext., 3RL	
" Sky Blue 3GL	
" Rubine B	
" Geranine B Ext.	
Diazogene Red B	
Diphenyl Fast Bordeaux G	
" Fast Bordeaux Red B	
Direct Catechine GR	
" Fast Black B	
" Fast Orange SE	Newport Direct Fast Orange RS
	Amanil Fast Orange S
	Erie Fast Orange A
	Pheno Fast Orange 2R
	Pontamine Fast Orange S
Direct Fast Violet 2B	
Formal Black R	
Icyl Orange G, R	
" Brown G	
" Violet B	
" Blue G	
" Blue Black 6B	
Naphtamine Fast Grey B	
" Light Violet 2B	
Naphtogene Pure Blue 4G	
Newport Neutral Grey G	
Oxamine Red	
Para Green B	
Paramine Brown B	
" Fast Bordeaux B	
Pluto Brown R	
Primuline	Various brands and makers
Pyrazole Orange G	Amanil Fast Orange GLZ, PRZ
" Orange R, 2R	
Toluylene Orange R	Amanil Toluylene Orange Y
	Amidine Orange GG
	Direct Orange Y
	Erie Orange Y
	Newport Toluylene Orange GR Conc.
Titan Scarlet 2B	
Triazogene Orange R	
Vulcan Black 2GW	
Zambesi Black D	

The following names furnished by American manufacturers are not in the above table and were received too late to check against the Color Index:

Solantine Red 8 BL	Pontamine Diazo Orange
" Violet R	" Scarlet B
Brilliant Sky Blue 6B, 8B	Setamine Scarlet 3B
Solantine Fast Heliotrope BL	

Further Rayon Growth Inevitable

(*Continued from page* 93)

Of the four major fibers used in the United States, less than 3%, by weight, consists of rayon. Continued future requirements in processes and expansion in production will lower costs and open up a still wider application.

Change in Import Situation

A combination of circumstances is gradually changing this market from one importing as high as 16,000,000 lbs. per year to one importing only specialty yarns in small quantities. A marked improvement in the quality of domestic made yarns as compared with the foreign product; the construction of plants by European manufacturers formerly importing here, and the gradual leveling of European prices for yarn to approximate more nearly our own, will all tend toward lowering imports and increasing demand for domestic supply.

If one should hazard even a conservative estimate it would be fair to assume that, granting an increased consumption of one or more of the four basic fibers, the relative percentage of consumption of rayon will be increased to at least 10% of the total in the next ten years.

Further Perfection Inevitable

In the next decade one will observe a closer grouping of manufacturers of rayon. Greater specialization by individual manufacturers will take place. It is quite possible that the mechanics of production will become so highly developed that a fiber will be perfected which will excel even the natural animal and vegetable fibers in utility and beauty. All factors will tend toward a further lowering of costs.

A greater coordination of the work of manufacturers and distributors will take place. Even today we find that one or more of the rayon manufacturers have taken an advance step in including on their directorates some of the leading executives of the weaving and knitting trade. An advisory board of such individuals is certainly commendable in any instance and tends toward a balance of judgment and a strengthening of the confidence of the trade.

Because of previous rapid expansion and many changes in the industry, the sales policies of some of the manufacturers have been somewhat unstable. The resultant detriment to business and loss of confidence to such manufacturers have been an experience by which they have profited. We shall see hereafter a higher regard for merchandising in its broadest application.

All factors will tend toward an expansion of the industry, the eventual limits of which cannot be forecast at this time.

American Glanzstoff Plant in Tennessee Reaches Production Ahead of Schedule

New Project in This Country Will Have Output Of Approximately 5,000,000 Lbs. from First Unit

Many new plants and additions to existing units have been under way during the year but that of the American Glanzstoff Corp., at Elizabethton, Tenn., represents the only new project which has reached commercial production since the last rayon review was published in the Annual Review and Forecast Number of TEXTILE WORLD. The following article summarizes the outstanding features of this new addition to the domestic rayon industry.

THE production of the first skein of yarn at the new plant of the American Glanzstoff Corp., Elizabethton, Tenn., on Aug. 1, 1928, marked the beginning of operations in this large new unit, and the first production was reached about one month ahead of the date predicted in February, at which time the corporation predicted the beginning of operations about Sept. 1, 1928.

The first steam shovel started work on Aug. 18, 1927, so that a little less than 11½ months were required from the turning of the first shovelful of dirt to the production of finished yarn. Since about 70,000 yds. of earth had to be moved in grading and levelling the site, this occupied over two months, and the first concrete foundation work was not poured until Nov. 4, 1927, so that the total time from the pouring of the first concrete to the production of the first yarn was slightly more than nine months.

Extremely rapid progress on the fabrication and erection of steel work was carried out by McClintic-Marshall Co., the entire main plant, with approximately 3500 tons of steel being detailed, fabricated, shipped, erected, and painted by them in 81 days, elapsed time, from the date of their contract, and during one week more than 100 cars of structural steel were delivered by them on the work.

It is expected to have graded yarns ready for the market immediately, and in steadily increasing quantities. All yarns produced in this plant will be of the new type with 32 filaments for 150 denier yarns, and of the soft silklike quality, without too much luster, which is now in demand.

To Continue Imports

The American Glanzstoff Corp. has been importing yarn at the rate of several million pounds per year, principally in the fine numbers, and of multiple filaments. On account of the fact that there is a considerable demand for imported yarn because of the return duty for rayon products exported, it is planned to continue the importation of yarn at approximately the present rate, and in addition to sell the output of the new plant in this country.

For this purpose, the sales organization has been built up to take care of the increased production by opening new sales offices in the various textile centers. The American Glanzstoff Corp. has provided experts in weaving and knitting for the assistance of their customers in solving problems and in finding new uses for the yarn.

Officials

The officials of the American Glanzstoff Corp. are Dr. Arthur Mothwurf, president; B. C. Dunlop, vice-president and in charge of the New York Office; A. L. Erlanger, assistant secretary and sales manager.

It is expected that full production of the new plant will be reached early in the year 1929.

The capacity of this new plant when in full production will be from 4,500,000 to 5,000,000 lbs. per year of 150 denier yarn.

Provision for Additional Unit

The new plant has been constructed as one unit of one-half the ultimate size contemplated, and layouts have been made to provide in every way for the construction of the second unit, without any changes whatever in the first unit. All of the buildings have been provided with temporary wood ends on one side, where the second unit will be constructed.

The layouts for the new plant were prepared in Germany by the engineering department of the American Glanzstoff Corp., based on their experience in the layout and construction of a number of European plants.

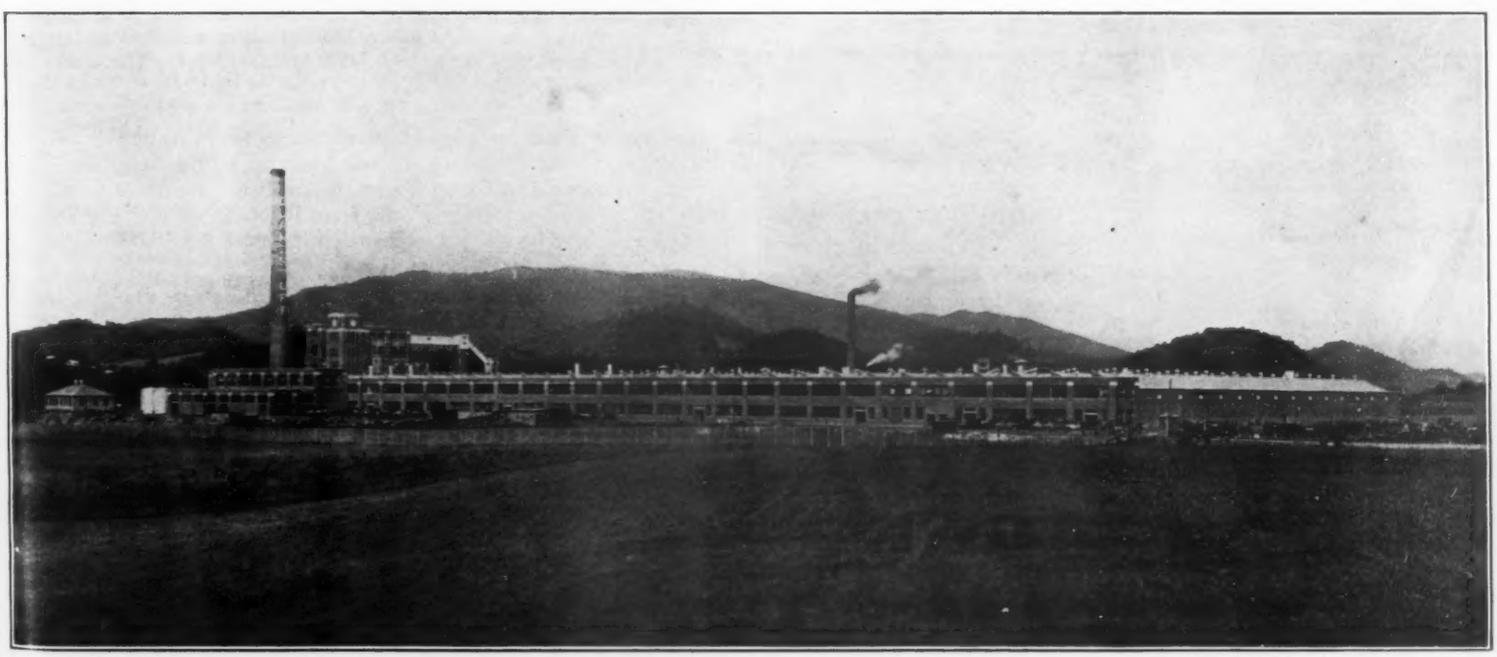
Provision has been made for convenience of operation, economy of handling materials and for the control of quality of product, as well as for the comfort and convenience of the employes.

The new plant includes exceptionally ample laboratories—both textile and chemical, for the thorough control of quality of product.

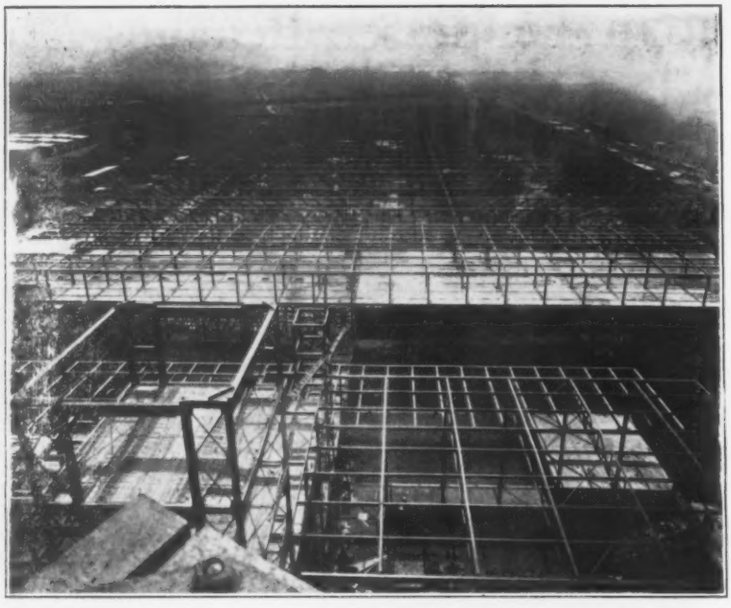
Total floor space of the plant is, in round figures, about 600,000 sq. ft.

Adjoins Bemberg Plant

The site for the new plant is located immediately adjoining that of the



Completed Plant of American Glanzstoff Corp.—Photo taken August, 1928



Steel Work Completed for Principal Group of Buildings. Photo taken Feb. 1, 1928

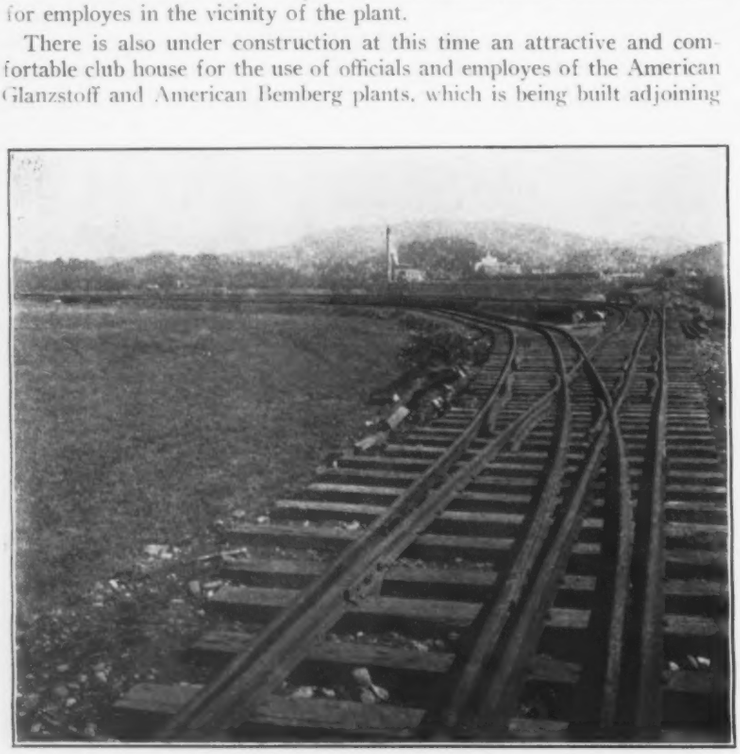
American Bemberg Corp. at Elizabethton, Tenn., with a distance of about 1600 ft. between the two plants. This site was selected only after a thorough study had been made by the engineers of the American Glanzstoff Corp. assisted by Lockwood, Greene & Co., Inc., engineers, of a number of possible sites in various States, which was carried out during the spring and early summer of 1927.

As a result of negotiations with the communities of Johnson City and Elizabethton, the county agreed to build an entirely new concrete road from Johnson City to the plant of the American Glanzstoff Corp. in addition to the existing concrete road over a more direct route, and this road is now in process of construction.

Community Plans

It was also agreed by the communities to provide immediately 2,000 houses for the exclusive use of Glanzstoff employes, and many of these houses have already been completed, and the balance is under construction. Plans are also under way for the construction of additional houses for employes in the vicinity of the plant.

There is also under construction at this time an attractive and comfortable club house for the use of officials and employes of the American Glanzstoff and American Bemberg plants, which is being built adjoining the new concrete highway now under construction.



Site of New Glanzstoff Plant at Left; American Bemberg Plant in Background. Photo taken Oct. 15, 1927

Water Supply

Water for all uses including power plant, fire protection, domestic water supply and for process requirements is obtained from the Watauga River adjoining the site and is furnished by a combined filter plant owned and operated jointly by the American Bemberg Corp. and the American Glanzstoff Corp. This filter plant has a total filtering and pumping capacity of 13,000,000 gallons in 24 hours.

Power Plant

The American Glanzstoff Corporation has constructed its own power plant for the purpose of supplying all power, heat and light as well as warm water and steam required for the process. In addition to this, connections are made with the power plant of the American Bemberg Corp. nearby, so that an exchange of power may be carried out between the power plants of the two companies, thus providing additional reserve supplies of power.

Organization for Construction

The design, construction, and equipment of the plant has been carried out under the direction of Oskar Oppenlander of the American Glanzstoff Corp., assisted by G. Brekke. Mr. Oppenlander is the engineer in charge of the entire project for the owners.

The preparation of detail drawings for construction, placing of contracts for the construction and equipment of buildings, and for machinery purchased in this country, has been carried out by Lockwood, Greene & Co., Inc., engineers, under the direction of Mr. Oppenlander. The field work has been carried out under the direction of W. G. Norteman, resident engineer for Lockwood, Greene & Co.

Principal Contractors

The contractors on the principal parts of the work were as follows:

Excavation: B. G. Young, Johnson City, Tenn., and Dempster Construction Co., Knoxville, Tenn.
General Construction: Hughes-Foulkrod Co., Philadelphia, Pa.
Structural Steel: McClintic-Marshall Co., Pittsburgh, Pa.
Roof Lumber: Long Leaf Yellow Pine Mfrs. Asso., New Orleans, La.
Fire Protection: Holyoke Valve & Hydrant Co., Holyoke, Mass.
Power House and Process Piping: Grinnell Co., Charlotte, N. C.
Chimney: Alphons Custodis Chimney Const. Co., New York.
Turbine: Westinghouse Elec. & Mfg. Co., New York.
Boilers: The Babcock & Wilcox Co., New York.
Stokers: Westinghouse Elec. & Mfg. Co., New York.
Coal Handling: Guarantee Construction Co.
Electric Wiring: Walker Elec. & Plumbing Co., Atlanta, Ga.
Refrigerating Equipment: DeLaVergne Machine Co., New York.
Transformers and Motors: General Electric Company, New York.
Air Conditioning: Carrier Engineering Corp., Newark, N. J.
Machine Shop Equipment: Summers Hardware Co., Johnson City, Tenn.
Filter Plant Equipment: Roberts Filter Mfg. Co., Darby, Penn.

Rayon Notes From Germany

The present production of the Aceta G, m. b. H. which is engaged on the acetate process is said to be 1,000 kilos, daily and it is understood that this will be increased to from 3,000 to 5,000 kilos. The works are at Berlin-Lichtenberg.

* * *

The Bemberg company has eventually succeeded in its long drawn out proceedings for the lawful use of their trade mark "Bemberg Silk." On appeal, the courts have decided that the company is entitled to use the trade mark for all fabrics produced from Bemberg yarns. The defendants have to bear the costs which amount to more than 8,000 marks.

* * *

The Glanzstoff company has nearly completed its new finishing works in Tannenberg and 200 to 300 workers will shortly be engaged there.

* * *

Some restriction of production is reported as having been necessitated at the Bemberg plant on account of the drought but this is only temporary. Production is normally on a 10,000-lb. per day basis and will be eventually increased to 19,000 lbs. daily.

* * *

Dr. Georg Froehlich, a lawyer and artificial silk expert, has resigned his directorships of the Glanzstoff and Neue Glanzstoff companies and also his seat on the Deutsche Zelta Co. He will continue his activities in the artificial silk industry however.

* * *

Imports of rayon into Germany in the first 6 months of 1928 amounted to 9,247,260 lbs., being slightly less than in the corresponding period of 1927. Exports increased to 7,125,580.